

AUTOMOTIVE INDUSTRIES

Engineering

The AUTOMOBILE

Vol. XXXIX
No. 5

GENERAL LIBRARY
AUG - 7 1918
DIV. OF MICH.

PUBLISHED WEEKLY
NEW YORK, AUGUST 1, 1918

Ten cents a copy
Three Dollars a year



Champion

Dependable Spark Plugs

Big Increase In Porcelain Efficiency

*2 1/2 Times the Resistance
to Breakage from Shock*

HOW to make porcelain for spark plug insulation, offer greater resistance to shock and vibration!

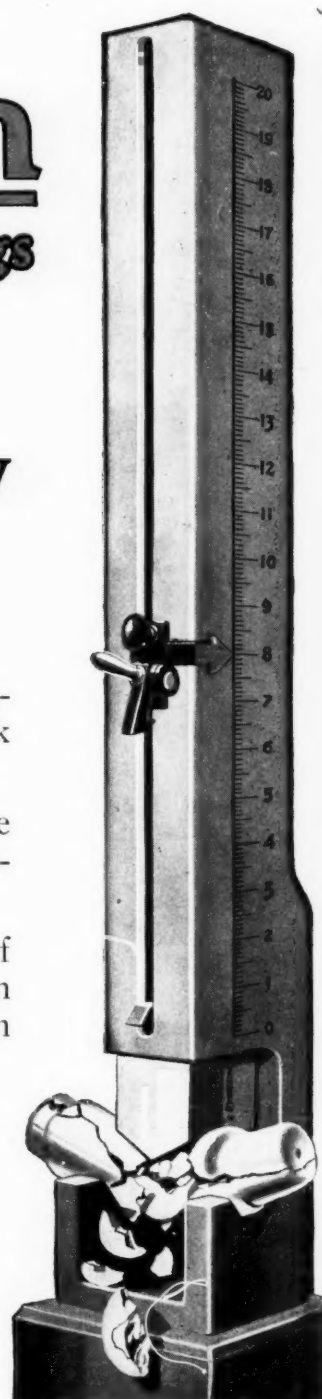
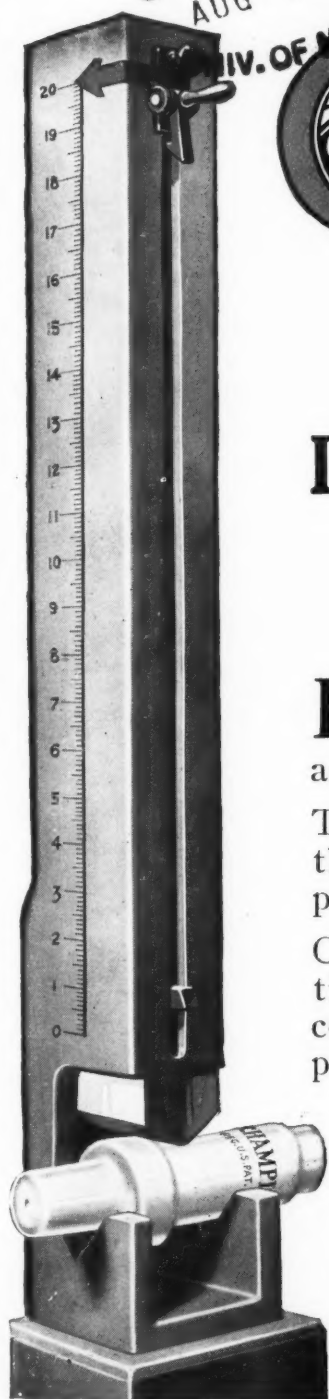
Ten years of original research work and the three-thousand-four-hundred-and-fiftieth experiment revealed the secret.

Champion 3450 Porcelain offers two and a half times the resistance to shock and vibration compared with the best previous Champion porcelain.

What an increase in that dependability which has given Champions their enormous prestige.

Always it has been to the dealer's advantage to sell Champions—now more than ever.

Champion Spark Plug Co., Toledo, Ohio





2:03



Patched and ready to use in 3 Minutes

JOHNSON'S Hastee Patch

Saves Time, Tires and Temper

WITH Johnson's Hastee Patch the most inexperienced motorist can satisfactorily and inexpensively repair his own tubes. No time, labor or heat required. The Patch can be applied in three minutes—at a cost of 2c—and it's so simple a child can use it.

Ready For Instant Use

With Johnson's Hastee Patch it takes but two or three minutes to make the repair and the tube can be pumped up immediately and is ready for instant use at any speed.

Better Than Vulcanizing

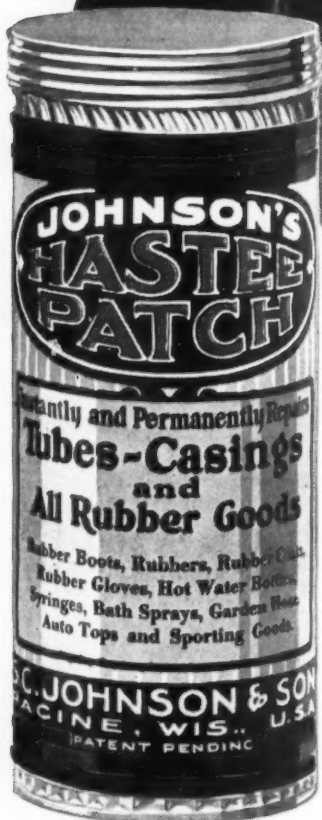
Johnson's Hastee Patch is much better than vulcanizing because there is no danger of burning and spoiling the tube. Johnson's Hastee Patch gives equally good results on a pin hole puncture or a large blow out. It is conveniently put up in strips so the user can cut just the right size patch for each repair.

Cut Down Your Tire Investment

If you'll carry a box of Johnson's Hastee Patch in your tool kit you can get away from the expense of a lot of spare tubes and casings which fast deteriorate during the hot motoring months. A box of Johnson's Hastee Patch in your car answers the same purpose as two or three extra tubes and casings, and there is a saving of 23c over garage vulcanizing on your smallest patch and much more on large ones.

If your dealer is unable to supply you use attached coupon.

S. C. JOHNSON & SON, Dept. A - RACINE, WIS.



Fine for Patching

*Garden Hose
Rubber Boots,
Coats and Gloves
Rubbers
Auto Tops
Foot Balls
Hot Water Bottles
And All
Rubber Articles*

S. C. JOHNSON & SON, Dept. A. Racine, Wis.

I enclose 50c for which please send me by prepaid Parcel Post a strip of Johnson's Hastee Patch from which 25 average size patches may be cut. Satisfaction guaranteed or my money back.

NAME

ADDRESS

CITY & STATE.....

AUTOMOTIVE INDUSTRIES

The AUTOMOBILE

VOL. XXXIX

NEW YORK—THURSDAY, AUGUST 1, 1918—CHICAGO

No. 5

Fifty Tractors in National Demonstration at Salina

Plowing 100 Acres an Hour on the Plains of Kansas—
Many New Machines Exhibited—Lack of Standardization
Noticed—Need for Real Tests Manifested

By David Beecroft

SALINA, KAN., July 30 (*Special to AUTOMOTIVE INDUSTRIES*).—Promptly at 1.30 this afternoon fifty tractors of nearly as many different makes started plowing a 240-acre field of Kansas winter wheat land; soon after 4 o'clock all of this was plowed, and incidentally the greatest tractor demonstration ever held had been formally opened.

The fifty tractors were lined up on a stretch one mile in width, and they plowed furrows in some cases one-half mile in length. The entire fifty started almost to a second at a flag signal, and over 25,000 spectators from Kansas and adjoining states followed the machines from one side of the field most of the way to the other.

In these days when wheat is so vital in our war program no sight on this side of the Atlantic could have been more inspiring, and the regret was that Herbert Hoover was not on hand to witness the soul-stirring sight. This plowing demonstration will be repeated three more afternoons.

Results of Tests Not Made Public

These afternoon plowing demonstrations are only a portion of the program of the National Tractor Demonstrations. Since the middle of last week different makes of tractors have been given belt tests to demonstrate their horsepower over a 2-hour period. In addition to these belt tests there have been fuel economy tests in which the machines under official observation have plowed at their rated speed and with their plow equipment for a 2-hour period. There have been dynamometer drawbar tests in which the drawbar pull for average work has

been officially taken and also the maximum drawbar from machines. All of these tests have been conducted by a committee of agricultural engineers selected from different state agricultural schools under the direction of J. D. Davidson of California.

Unfortunately the results of these different tests have not been made public and will not be made public until after the demonstrations are over. The reason for this is that for months many of the tractor makers have strenuously objected to any form of test that would show fuel consumption per acre plowed, drawbar horsepower and belt performance of the engine.

Those who were insistent on such tests compromised by agreeing that such tests should be held, but that it would be optional with any firm to take them. A second compromise was agreed upon by which the different tractor makers agreed not to advertise during the demonstration any of the results of these tests.

It is for this reason that the present demonstration is robbed of a great factor of interest, as many of these tractor makers who have taken these voluntary tests do not yet know the official figures of their machines.

Should Show Tangible Results

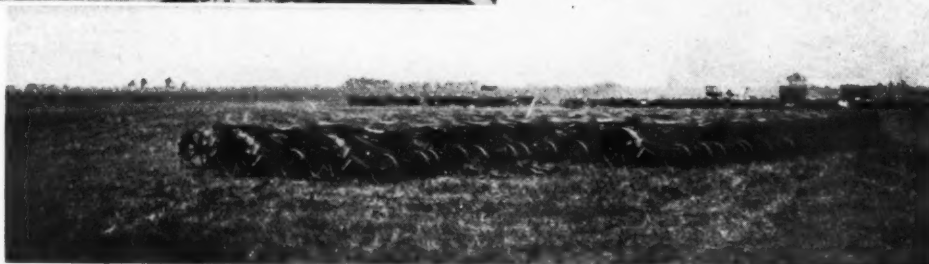
It is probable that before another year comes round sentiment favoring real tests will have worked out a feasible program so that the value of these demonstrations as attendance drawers will be continued. To-day E. E. McCullough, general manager of the National Implement and Vehicle Association, suggested that next year a committee of mechanical engineers from various

Tractor and Implement Exhibits at the National Tractor Demonstration at Salina, Kansas



A group of farm implements, giving some idea of the variety of the exposition

The Fordson tractors were there in force, a whole train-load having been purchased and delivered



During the Week, 112 Tractors Were Demonstrated, Pulling Practically Every Type of Farm Implement



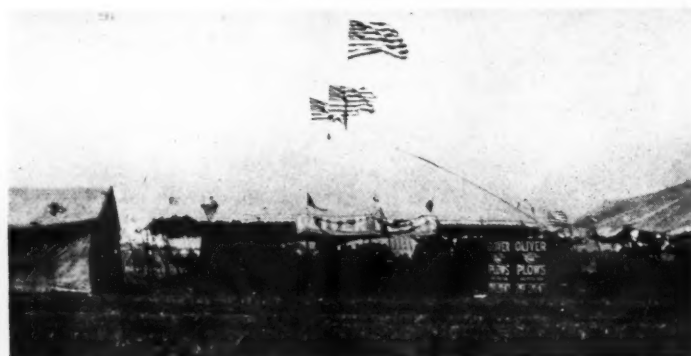
Where Russell and I. H. C. tractors and P. & O. plows were exhibited



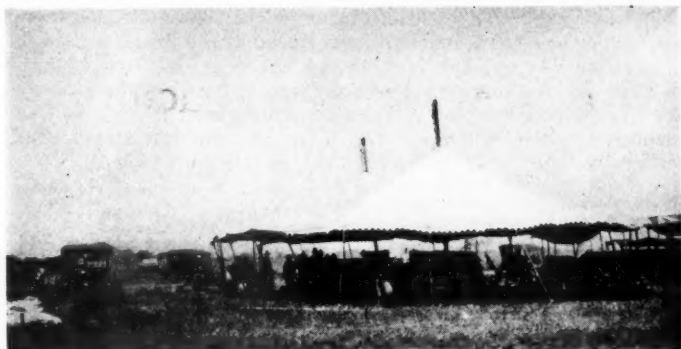
The tent of the Port Huron tractor, with several Clevelands in front



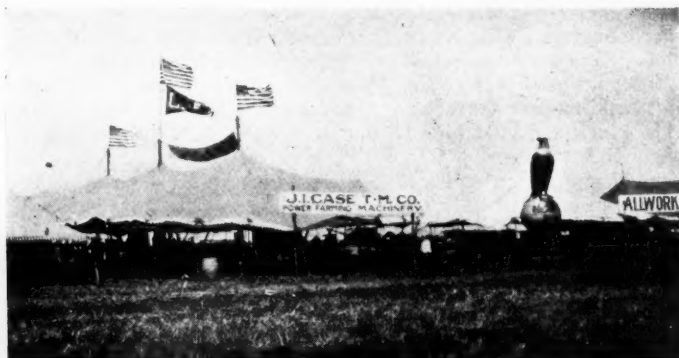
Where the Hart-Parr line was displayed



The exhibition of Oliver plows was complete



Two more of the tractor exhibitors' tents, the one at the right showing the Port Huron exhibit



Both Avery and Case had extensive lines on exhibition in their tents

agricultural colleges be given official charge of such a series of tests with power to make and give to the public an official report of the tests. It is possible that participation in such will be voluntary, as was the case this year, but there will be the advantage of giving out the results before the demonstrations are over.

It is a question of grave concern as to whether manufacturers would be willing to participate in these demonstrations year after year unless some tangible results such as would emanate from tests could be made public. So far as these afternoon plowing demonstrations are concerned, they are not of much value to makers but appeal to the farmers attending. As such they are of local value only and not of national significance. Real tests would add a national aspect to the demonstrations and give an aspect that would go far toward assuring continued value.

The afternoon plowing demonstrations are much like a selling demonstration of an automobile on a good road. Every tractor is expected to be able to plow on a level field, and when the period of work is confined to 2 or 3 hours there is no opportunity for the spectator to get much of a line on the endurance of the machine.

Fortunately, the present demonstrations have brought out other forms of trials that do give a true criterion of the value of the machine. Starting from days before the present demonstrations opened, the Parrett company started one of its tractors pulling three plows on a continuous 100-hour test plowing night and day. The test was also a non-engine stop affair. Never before has such an official test been undertaken in connection with a public demonstration. The Parrett carried out its schedule and finished the job at 4 o'clock this afternoon.

The official figures are not yet available, but the tractor approximated 1 acre plowed every hour from the start with a consumption of 2 gal. of kerosene per acre. During the test the engine stopped but twice in 103 hours and 20 minutes that it was running. There was one stop of 3 min. 40 sec. caused by dirt in the sediment cup in the kerosene line, and there was a second stop for this same cause which required 2 min. additional.

The tractor was compelled to stop plowing for 13½ hours due to rain, but during all of this time the engine was kept idling at a speed of 360 r.p.m. Very few mechanical troubles

occurred. It was necessary to change one spark plug, which was done with the engine still running. One priming cup was also changed. This official test, in which every ounce of kerosene used was weighed by official observers and in which accurate record of every detail of the test was kept, marks a new era in official tractor performances, and it will do much to stimulate such tests, which are highly desirable.

Fordson Is Officially Tested

To-day the big interest of the demonstration was in the debut of the Fordson at an official test and the further fact that Henry Ford was on hand to see his machines. The fact that there are in Salina to-night 284 Fordsons to be delivered this week to farmers in Kansas added a chapter of realism that points more than any other one thing to the future magnitude of the tractor industry. These machines represent 2 days' output of the factory. The machines have already been sold to Kansas farmers through Ford dealers here.

The present demonstrations offer one of the best periods of the year for observing the progress that has been made in tractor designs during the past 12 months. The general entry of automotive makers into this field during the past year has not brought out as much new design and as many new types as was expected a year ago.

From the automobile end Ford has made good in a run-away fashion, some of the leading tractor makers frankly admitting that he has got the jump on them, and also admitting that they did not think it was possible to get into production as Ford has in such a short time.

General tractor development along engineering lines has not made so much progress as was expected. This is largely due to the demand for machines brought about because of the war, and when demand is so great it is not surprising that changes in design and general improvements are not up to expected standards.

There are several new machines, but the most permanent progress has been made by companies that are bulwarks in the field and are counted among the pioneers. Thus, Case has brought out its line of three new machines all built around similar fundamentals, so that this concern has its program for the future incorporated in these. Their case is parallel to that of a motor truck maker who has completed his line with a list of different capacity trucks that cover the

entire field he expects to cater to. Case now has a 10-18 for two plows; a 15-27 for three plows, and possibly four; and a 20-36 for four plow or light work with five plows.

Moline has developed its two-wheel Universal which is now a four-cylinder design with a complete electrical system embracing ignition, starting and lighting, this being the first machine to be so equipped. It goes a step further with electric governor for fuel feed.

An entry from the automobile field is the R & P tractor built by the Republic truck organization. This tractor was shown at the Kansas City tractor show but is not in production yet and consequently cannot be considered as having taken a fixed place in the industry.

Many New Models on Hand

Among the pioneer makers are others that have added new models. Avery has a new design which follows previous Avery fundamentals but has a four-cylinder horizontal opposed engine. This marks the first use of this type of engine or even a four-cylinder engine with this concern.

International Harvester, which has always clung to single- and two-cylinder engines for tractor use, has also brought out a four-cylinder design. It too is a horizontal job, but has the cylinders parallel like the fingers on the hand, with the crankshaft at one end. It is a valve-in-the-head design. It was expected that this company would show its new vertical four-cylinder design, but in this the spectators were not to be satisfied.

Several other new tractor models have been brought out. Thus Aultman & Taylor, which has previously built only very large traction engine types, has a new model with a four-cylinder vertical engine, marking the first time this pioneer concern has adopted such an automobile type of power plant. It uses a 4% by 6% Waukesha engine and is rated at 15-30 hp. It clings to the high-wheel design, using 60-in. drivers.

Another new machine is the Frick, a four-cylinder job fashioned after Parrett lines with the vertical engine mounted transversely. There is a Port Huron, a four-cylinder vertical engine job with a combination friction and gear transmission. The Uncle Sam, a newcomer, also uses a vertical type of four-cylinder engine. The same can be said of the Yankee and the Hession, both new machines.

The vertical type of automobile engine has practically usurped the new model field and in doing so has displaced the horizontal twin-cylinder engine in which the cylinders are parallel, with the crankshaft at one end.

The crop of new tractor designs indicates a great lack in variety of what might be designated standard parts for assembled tractors. There is a good variety of vertical engines to select from and the value of this is shown in the general use of this kind of engine in the new models.

Need More Standard Parts

On the other hand, no such opportunity for selection can be found in gearsets, and so the gearset situation remains chaotic. One concern has perfected a design which is meeting with general approval. This is Nuttall, but there should be two, three or more supplying such. The demand for good tractor gearsets would warrant much greater activity.

In the steering gear field chaos is literally rampant and there are many—nearly a dozen—steering gear designs that might be described as examples of American ingenuity, but they cannot be described as examples of good engineering. If there were two or three good standardized steering gear jobs the situation would clarify very quickly.

Some standardized design of front axle is needed. There are several very weak designs; in short, there is not any standardized design such as we have in the truck field or in the automobile field. As a result, ingenuity again runs rampant and engineering is thrust into the background. There are too many built-up axles that are not nicely balanced with the job they have to take care of.

There is nothing standardized as yet in the way of the pressed steel frame design. One or two pressed steel frames have come out, the R & P suggesting how easy it would be to arrive at some definite standard of shape.

As a result of no such existing standard there are two or three new tractors in which the channel side members of

the frame are spliced in the center where the stress is greatest. This has been done in order to have the front end high enough to support the engine and the rear end low enough to pass under the axle. Some frames are entirely too heavy for the job, and there are others which are too weak and although reinforced they weave as the tractor approaches under its load.

Reduce Weight; Increase Accessibility

This review of lack of standard units for those who would like to bring out a new machine could be continued much further, and the thought in enumerating these various parts is to indicate how tractor engineering standard is being held back.

A practical example of this came up to-day when one machinery concern engaged an engineer to develop a tractor that would be entirely different from others, this being the company's conception of an engineering task. As a result, the job has been described by several as a literal freak in which valve cages are used and many other disproved designs featured. Some tractor companies will have to change their engineering programs, otherwise others cannot very heartily approve of what should be war engineering work.

One engineer admitted to-day that he had told his company, which makes a large traction engine type, that he could cut 9000 lb. out of the tractor and have a more efficient and powerful machine. In these days of metal conservation and fuel conservation we should pause and think how really useful this metal could be made in other ways and how much of the fuel used to carry this 9000 lb. of useless weight could be better used in our war work.

Among engineers there is a good deal of criticism to the effect that several of our new tractor models are not nearly as accessible as they should be, reference being specially made to the need of adjusting or replacing lower crankshaft bearings. No definite policy regarding accessibility can be laid down. At best a path of compromise must be selected.

One engineer declares that the mechanical reliability of the part must be the prime consideration, and it is better to sacrifice accessibility if reliability is achieved thereby. One of our leading electricians when confronted with a similar situation invariably commented that he would willingly sacrifice 10 per cent of electrical efficiency if he gained thereby in mechanical efficiency.

Trend Toward Four-Cylinder Engine

It is true that many tractors have the lower pan of the crankcase well fenced in with front axle struts, steering linkages and cross frame braces and in some instances it looks like a rebuilding job to take up a lower connecting rod bearing. Engineers are generally free to criticize, but in seeing the mote in the other engineers' eyes fail to see the beam in their own.

It is almost too early in the industry to place too much importance on the mathematics of tractor specifications. There are a few unmistakable tendencies, one of which is toward the use of the vertical type of four-cylinder engine. The enclosed gearset is equally certain, and while any standardization of design is yet some distance off, the use of forged gears with cut teeth and anti-friction bearings as well as spliced shafts is certain.

Whether the three-plow tractor or the two-plow is to be the leader is very uncertain. Each tractor maker tries to answer this question in accordance with present manufacturing plans. The three-plow man declares that the two-plow job is too small for threshing machines, but the two-plow maker points to the new designs of threshing machines that are being brought out to meet the needs of his machine. The two-plow machine occupies the base of the pyramid, which means great volume of sales, and where there is great volume there are pretty certain to be special designs to go with that volume.

The redesigning of farm machinery for the tractor standard is one of the most encouraging conditions of the present year. The farm machinery field is being literally revolutionized. Plows are being designed, and already have been designed, which admit of speeds which the implement makers

(Continued on page 213)

War Industries Board May Control All Raw Materials and Finished Products

New Priorities Regulations Include Everything Except Food, Fuel and Feeds—
Certain Consumers Given Automatic Ratings Under Preference

List—Board to Confer with Consumers on
Their Steel Requirements

WASHINGTON, July 30.—A new turn has been given priorities matters through the issuance of Circular 4 by the Priorities Division of the War Industries Board, and under which the complete control of all raw materials and finished products as well as steel and iron, and excepting only fuel, food and feeds, appears likely.

The War Industries Board has let it be known in a statement that steel will continue to be the chief commodity to be governed by the new priority regulations, but the regulations themselves are so framed as to include all raw materials and finished products.

The new regulations are for the duration of the war, and under their terms all consumers are placed under two broad heads as follows:

1. Consumers who get materials:
 - (a) Through Priorities Certificates.
 - (b) Through operating under a General Purpose List.
 - (c) Through being on a Preference List.
2. All other consumers, who are not entitled to Priorities Certificates, do not operate under the General Purpose List and are not on the Preference List will get materials and products only after all requirements in Class 1, above, are filled.

The regulations include classes of consumers similar to those laid down for the steel program; in addition there is what is termed a General Purpose List, this including the following seven divisions under which steel priorities were laid out early in June: (1) *Ships*; (2) *Aircraft*; (3) *Munitions*; (4) *Fuel*; (5) *Food*; (6) *Clothing*; (7) *Railroads*.

Further, there is what is termed a Preference List, under the various headings of which certain consumers are automatically classified and thereby given priority in the receipt of materials and products.

The various classes of consumers include AA, A, B, C and D, with subdivisions in each class indicated by a suffix number, such, for example, as Class AA1.

Class AA comprises all the emergency war work of an exceptional and urgent nature.

Class A comprises all other war work, including aircraft, military tractors and tanks and materials required in their production.

Class B comprises orders for work which, while not primarily designed for the prosecution of the war, are of public interest and essential to the national welfare or otherwise of exceptional importance.

Class C includes all orders and work not covered by priorities certificates or not given an automatic rating in the above classes but which are to be utilized in furtherance of one or more of the purposes embraced in the General Purpose List or the Preference List adopted by the War Industries Board and the Fuel Administration.

Class D comprises all orders and work not embraced in any of the other classifications.

The Preference List is an entirely new part of the regulations, and under it certain consumers are given automatic classification. The complete Preference List follows:

PREFERENCE LIST

Aircraft—Plants engaged exclusively in manufacturing aircraft or supplies and equipment therefor.
Ammunition—Plants engaged in the manufacture of ammunition for the United States Government and the Allies.
Army and navy cantonments and camps.

Arms (small)—Plants engaged in manufacturing small arms for the United States Government and the Allies.
Chemicals—Plants engaged exclusively in manufacturing chemicals.
Coke plants.

Domestic Consumers.

Electric Equipment—Plants manufacturing same.

Electrodes—Plants producing electrodes.

Explosives—Plants manufacturing explosives.

Farm Implements—Manufacturers exclusively of agricultural implements and farm operating equipment.

Feed—Plants producing feed.

Ferro-Alloys—Plants producing.

Fertilizers—Manufacturers of fertilizers.

Fire Brick—Plants producing exclusively.

Food—Plants manufacturing, milling, preparing, refining, preserving, and wholesaling food for human consumption.

Food Containers—Manufacturers of tin and glass containers and manufacturers exclusively of other food containers.

Gas—Gas-producing plants.

Gas—Plants manufacturing exclusively gas-producing machinery.

Guns (large)—Plants manufacturing same.

Hemp, Jute and Cotton Bags—Plants manufacturing hemp, jute, and cotton bags.

Insecticides—Manufacturers exclusively of insecticides and fungicides.

Iron and Steel—Blast furnaces and foundries.

Laundries.

Machine Tools—Plants manufacturing machine tools.

Mines.

Mines—Plants engaged exclusively in manufacturing mining tools and equipment.

Newspapers and Periodicals—Plants printing and publishing exclusively newspapers and periodicals.

Oil—Refineries of both mineral and vegetable oils.

Oil Production—Plants manufacturing exclusively oil-well equipment.

Public institutions and buildings.

Public utilities.

Railways.

Railways—Plants manufacturing locomotives, freight cars, and rails and other plants engaged exclusively in manufacture of railway supplies.

Refrigeration—Refrigeration for food and exclusively ice-producing plants.

Seeds—Producers or wholesalers of seeds (except flower seeds.)

Ships (bunker coal)—Not including pleasure craft.

Ships—Plants engaged exclusively in building ships (not including pleasure craft) or in manufacturing exclusively supplies and equipment therefor.

Soap—Manufacturers of soap.

Steel—Steel plants and rolling mills.

Tanners—Tanning plants, save for patent leather.

Tanning Extracts—Plants manufacturing tanning extracts.

Tin Plate—Manufacturers of tin plate.

Twine (binder) and Rope—Plants producing exclusively binder twine and rope.

Wire Rope and Rope Wire—Manufacturers of same.

The following is a list of materials, equipments and supplies which automatically take the classification prescribed:

Manufacture of turbines (all classes).....A-4
Repair or construction steam railway locomotives for use on
railroads under jurisdiction of U. S. Railroad Administration..A-4
Production of electrodes.....A-5
Manufacture of wire rope.....A-5
Building of ships or other water craft for and under direct
contract with U. S. Shipping Board Emergency Fleet Corp....A-5
For building all cargo water craft (not pleasure craft) except

those under construction by or for the U. S. Shipping Board Emergency Fleet Corp.....	A-6
Manufacture of machine tools (metal and wood) machinists' tools, small tools, hand tools, mining tools, machinery and equipment	A-6
Manufacture of steam railway materials, equipment and sup- plies (other than locomotives) for use on railroads under jurisdiction of U. S. Railroad Administration.....	B-1
Manufacture of locomotive cranes and travelling cranes.....	B-1
Manufacture of electrical equipment other than turbines (not including electrical supplies as distinguished from equipment).....	B-2
Manufacture of farm implements.....	B-2
Manufacture of textile machinery.....	B-2
Manufacture of tools, implements, machinery and equipment required for production, harvesting, distribution, milling, canning and refining of foods and feeds.....	B-2
Manufacture of binder twine and rope.....	B-2
Manufacture of oil well supplies or equipment, by which is meant supplies for the production of petroleum and natural gas but not including pipe lines, storage tanks of 1,000 bbls. capacity or over, tank cars or refineries.....	B-2

Orders that come under these various automatic classifica-
tions must be endorsed by an affidavit to the effect that they
have been automatically rated in their particular class and
that consumer has filed a pledge with the War Industries
Board to the effect that the materials, equipment and sup-
plies will be used in accordance with the classification.

Applications for higher ratings should be made only when
it is in the public interest and where automatic ratings will
not secure delivery of the order on or near the date required.

Class AA orders and work take precedence over all other
classes with classes A, B, C and D following respectively, all
irrespective of the dates the orders were placed. Orders
with a lower suffix number in similar classes are given pre-
ference, as, for example, class A-1 precedes class A-2.

However, the classification of an order means simply that
it should be given such precedence over orders of lower clas-
sification as may be necessary to insure delivery on the date
specified in the order. It does not mean that work shall
cease on orders of a lower classification or that the order
should be completed and delivery made in advance of lower
classification orders if this is not necessary to effect delivery
within the time specified.

The one to whom the priority certificate is directed or who
has received an order taking automatic classification is ex-
pected to make his own production plans to secure maximum
efficiency out of his operations.

Special forms of priority certificate applications will be
furnished by the Priorities Committee.

As a general rule, when an application is necessary it
should be made by the consumer. Orders demanding priority
certificates for Government contracts will receive certificates
by application made directly to the committee. Government
sub-contractors, one or more times removed from a direct
contractor but furnishing materials to be used in fulfillment
of a direct contract, can secure priority assistance by apply-
ing directly to the committee.

Purchasers of materials, commodities or supplies which fall
into class B can secure priorities assistance from the com-
mittee.

Application for priority should be made against the actual
producer or manufacturer and will not be issued except in un-
usual occasions against jobbers or brokers.

Judging by the several schedules and the Preference List,
it is safe to assume that all articles directly required for
the war, including such as airplanes, military passenger cars,
military motor trucks, military tractors, military motorcycles
and tanks, will fall within the priority certificates classifica-
tions.

Farm tractors are automatically placed in class B-2, coming
under the head of farm implements, and also entitled to pri-
ority certificates.

Since Circular No. 4, which contains the above regula-
tions, was compiled several weeks ago, although just issued,
it is fair to assume that commercial motor trucks will prob-
ably be given a class B automatic rating. This assumption
is based on the favorable hearing held last week between the
Priorities Committee and the motor truck industry represen-
tatives, at which time it was stated that a reasonable supply
of steel would be assured the truck makers.

Passenger cars for general use will in the main fall into

class D, but under special occasions may be given a higher
rating. Individual consideration will be given various pas-
senger car makers in their requests for the raw materials
they need, and such matters as conversion possibilities, un-
filled partly completed orders, etc., will be weighed.

The new regulations call attention to the method of secur-
ing a place on the Preference List. Applications must be
made on special forms which can be secured from H. G.
Philips, secretary of Priorities Board.

The Priorities Committee will not handle fuel priorities,
which will remain entirely under control of the Fuel Admin-
istration. Application for transportation assistance should
be made to T. C. Powell, manager of Inland Traffic, War In-
dustries Board, Washington, D. C.

In its statement the War Industries Board makes plain
that curtailment of the use of steel will continue to be ef-
fected as in the past by means of a reduction of needless
lines, varieties and sizes of products, elimination of wasteful
styles, models and methods and by the substitution of products
or materials.

"As it is obviously impossible," states the board, "to supply
all industries utilizing steel and iron with their normal sup-
ply, the board will, with its Priorities Division and other
sections, operate a system of industrial hearings in which
committees representing entire industries may appear and
present:

- A—Their normal requirements for iron and steel.
- B—Their reasonable requirements under war conditions.
- C—The stocks now on hand in each plant.
- D—The fuel consumed and all other pertinent facts.

The board emphasizes that there will be comparatively little
iron and steel left to distribute to those industries engaged in
non-war work and for consumers for application to non-war
purposes. It states, however, that:

"A portion, at least, of the product of nearly every in-
dustry may be classed as a direct or indirect war requirement
or essential to the civilian population, but in many the per-
centage of non-essentiality predominates. On the other hand,
nearly every industry, including so-called war industries, has
a percentage of non-essentiality in its production.

"It is the policy of the War Industries Board, through the
hearings mentioned above, to take counsel with each industry,
determine the extent to which it can and should, as a war
measure, curtail its production, and particularly curtail its
consumption of iron and steel, limiting its output to essential
uses as far as practicable but without destroying or unneces-
sarily injuring an industry or legitimate business."

Proposed Change in Pipe Thread

IN 1913 it was suggested to the American Society for Test-
ing Materials that a committee on tubes investigate the
question of a change in pipe thread standards. A sub-com-
mittee was appointed to collect data on pipe failures and to
make tests showing the comparative strength of the Briggs
(present American standard pipe threads) and Whitworth
threads.

In January, 1915, the Executive Committee appointed a
new technical committee on the Revision of Pipe Threads, and
the following societies were asked to co-operate with this
committee: American Gas Institute, American Society of
Mechanical Engineers, Manufacturers' Association on Stand-
ardization of Fittings, Master Car Builders' Association,
Railway Signal Association. Various forms of threads were
proposed and a number of experiments were made by the
committee to determine the strength of the threads, the tight-
ness of the joint and the practicability of cutting the various
forms of threads and of the interchangeability of the sug-
gested types with the existing standard. These experiments
were completed and the results were reported to the Society
for Testing Materials.

This work, of course, is all preliminary, and the most diffi-
cult part of the work is still to be done. The tremendous
manufacturing difficulties involved in any change in standard
of pipe threads are fully realized. The type of pipe thread
which may be employed is a matter of design and it has
therefore been decided to transfer the work to the American
Society of Mechanical Engineers.

The De Haviland IV Biplane

Description of British Long-Distance Reconnaissance and Bomb-Dropping Machine, Which Also Is to Be Built in the United States, Fitted with the Liberty Engine—The Model Described Carries a Rolls-Royce Engine

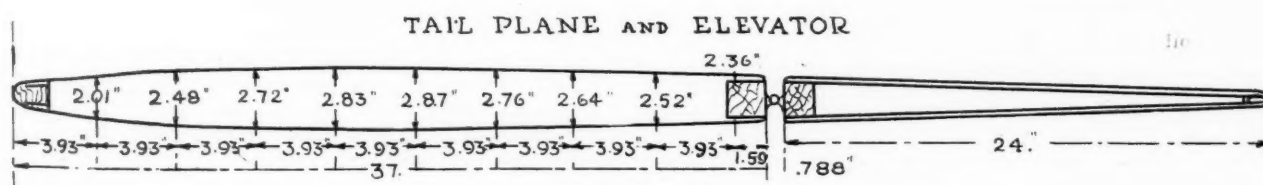
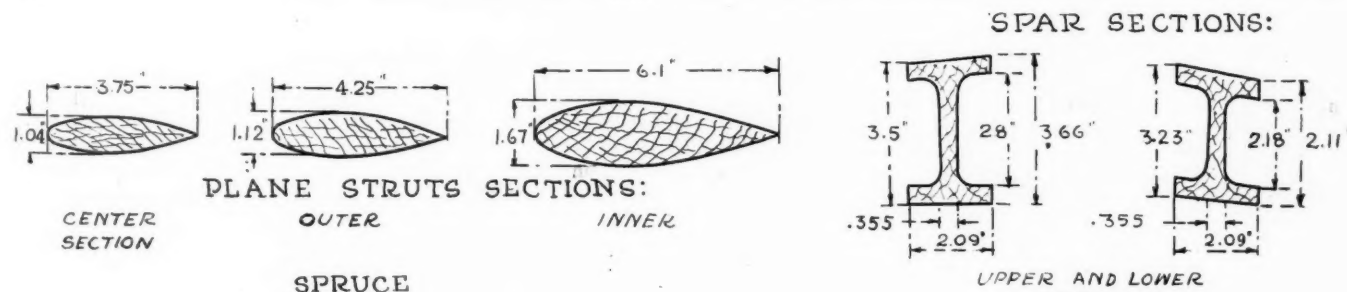
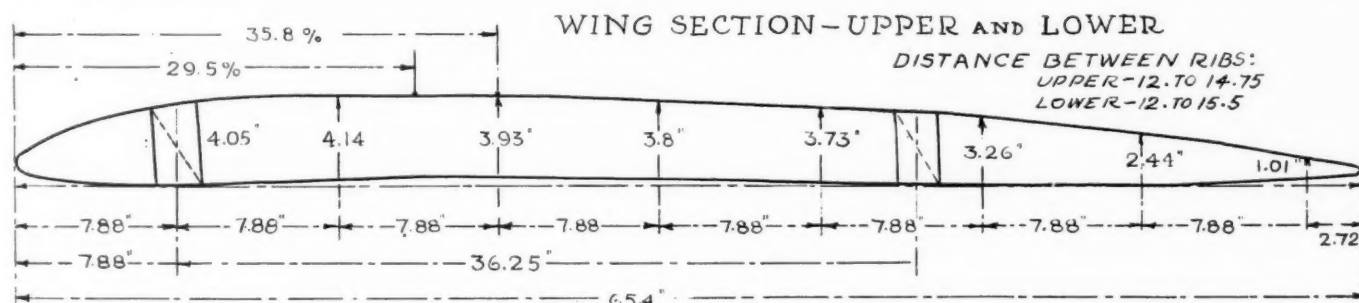
FOR the following description of the De Haviland biplane, one of the leading types of long-distance reconnaissance and bombing machines used by the Allied armies, we are indebted to our London contemporary *Flight*, which had it translated from the German aircraft periodical *Flugsport*. We have changed all dimensions both in the text and illustrations from millimeters to inches, having redrawn the illustrations.

This large airplane is chiefly built by the Aircraft Mfg. Co., Ltd. The different machines show minor differences in construction and outfitting according to the time of construction. Both wings of the two strutter biplane, which have distinctly rounded tips, have a span of 508½ in. (42½ ft.) and a chord of 66 in. The stagger is 12.5 in. There is no sweep-back, but the upper and lower planes are attached, respectively, to a center section 27.5 in. wide and direct to the body, at a dihedral angle of 174 deg. The pilot, whose seat is right under the top plane, center section, has a good view forward. The center section in the wings have their trailing portions cut away in the center to give a better view backward. The angle of incidence is 3 deg. at the body and at the top plane center section. Both main spars, which are of spruce, are of one section, left solid where the compression ribs are. At these points and where fittings are located the spars are not only left solid but are re-

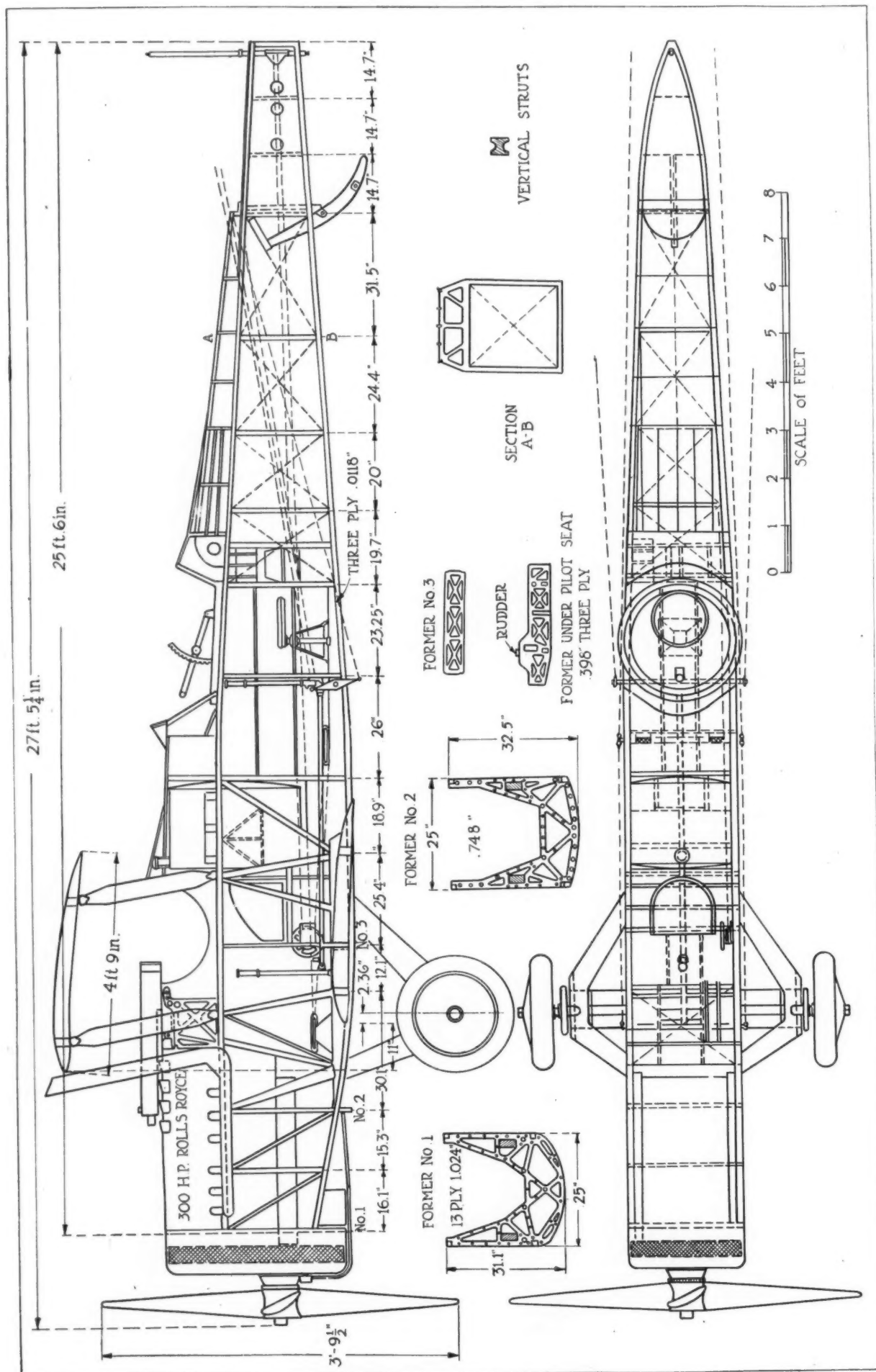
inforced by mahogany pieces glued and screwed on. At a point between the inner inter-plane struts and the commencement of the wing flaps the main wing spars are spliced and bound with fabric.

The wing ribs are only very slightly cambered on the under surface. Leading and trailing edges are slightly raised. Into grooves in the two flanges, which measure ½ in. in width and 0.175 in. in thickness, are glued and tacked with brass tacks the three-ply webs, which are provided with large lightening holes. The ribs at the struts and in the middle of each bay have flanges as wide as 1.45 in. and the web between them is solid spruce between the spars. Between every two ribs, which are spaced 12.2 to 15.7 in. apart, there is a false rib extending from the leading edge to the front spar. The internal wing bracing, which is of thick-ended wire, is in duplicate up to the middle of the outer bay. The wing covering is of a yellowish white color, and is sewn to the ribs in such a way that the stitches surround the whole rib. In front of the trailing edge, which is in the form of a strip of wood, eyelets are incorporated in the under surface, which serve to equalize pressure and to drain out moisture.

The crank levers of the wing flaps, which in all the planes are hinged direct to the rear spars, are made of 1/16-in. sheet aluminum which is reinforced on either



Details of wing rib construction



Assembly views and details of the body

side by facings of wood riveted on. The same construction is employed for the elevator and rudder cranks. At their outer end, where the control cables are attached, the aluminum cranks are doubled over. The very simply arranged wing bracing consists of stream line wire, while the external drift bracing takes the form of cables.

The wiring fittings are, as in so many other English machines, very simply carried out. Sheet steel plates 0.18 in. thick at the outer plane struts and 0.18 and 0.12 in. at the inner struts, having lugs bent to the angle of the bracing wires, are secured to the wing spars by two bolts. A large forked bolt passes through the center of the spar, while a second, smaller one, passes down the outside of the spar. The interplane struts, which are made of spruce, are of stream line section, and the inner struts are kept stronger than the outer ones. On the ends of the struts are short sheet steel shoes, into which are riveted aluminum packing pieces hollowed out in the center. Through these are passed 5/16-in. steel bolts, which rest in the forked end of the spar bolts, the bracing wires keeping the struts in place. The struts for the top plane center section are similarly attached.

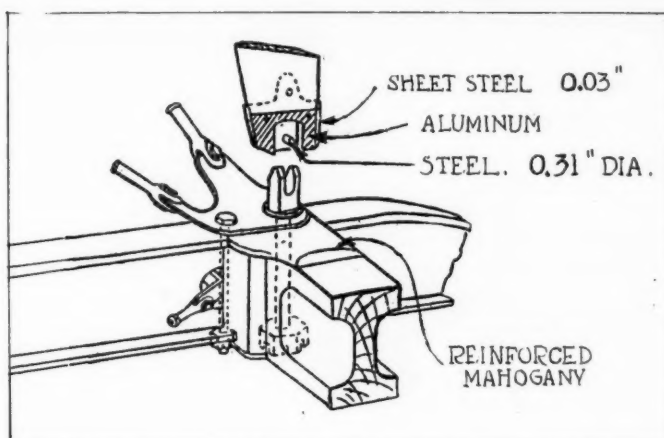
Method of Building Up Body

The fuselage is covered with ply wood up to a point behind the gunner's cockpit, this part being built up without the use of diagonal bracing. The longerons are of spruce and the engine bearers of ash. The formers, as well as supports for controls and machine guns, are made of ply wood, some of which is 13-ply and as much as 1 in. thick. The fittings for the attachment of the lift wires are each connected with two 5/16-in. through-bolts. The after portion of the fuselage is carried out in the usual manner as a girder, and the longerons are spliced. This does not apply to the extreme rear part underneath the tail plane, which is covered with ply wood 1/8 in. thick. In the front the fuselage has a rounded top. From the observer's seat vertical formers gradually carry the top into the rectangular section at the beginning of the tail plane.

The undercarriage is very light in proportion to the heavy machine. It weighs 119 lb. Each pair of struts is of solid wood and is not bound with fabric. Screwed to the struts are vertical strut-shoes of wood, which carry, in addition to the wheel axle, horizontal tubes for the attachment of the rubber shock absorbers. The axle rests between two cross-struts of wood, which are shaped to a fair shape and connected at the bottom by 1/8 in. three-ply. In order to cause no eddies during flight the axle is fitted into the stream line casing thus formed by covering its upper side with a layer of wood suitably hollowed out and secured to it with a wrapping of fabric. In order to better guide the axle in the slots in the struts this casing of wood is left square at this point and entirely surrounds the axle. It is covered with sheet metal. The diagonal bracing of the undercarriage is in the form of stream line wire, and is only placed in the bay of the front chassis struts. In addition there is a horizontal tension wire running in front of the stream line cross-strut.

Attachment of Tail-plane

The tail-plane, which is of rectangular plan form with rounded corners, is so attached to the body that its angle of incidence can be carried from the pilot's seat, during flight, from +2 deg. to +5 deg., as in the Sopwith. For this purpose its front spar is so mounted as to be free to rotate, while the rear spar with its bracing is secured to a vertical tube placed in front of the stern post. This tube carries a thread engaging with an internally



Interplane strut attachment

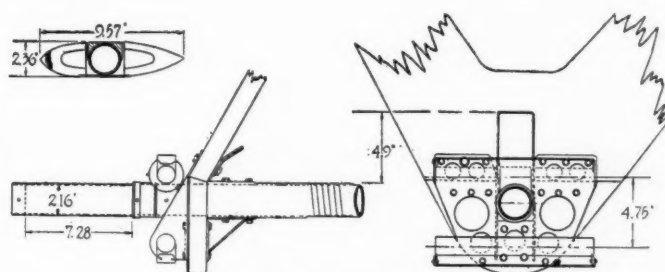
threaded bobbin, bolted to the stern post but free to rotate, operated by a hand wheel and cables, and forcing by its rotation the thread, and with it the vertical tube, up or down. The two elevator flaps, hinged to the tail plane, are not connected to one another. The rudder has a balanced portion as do many German machines.

The 12-cylinder Rolls-Royce motor develops, according to the firm's plate on it, 300 hp. at 1650 r.p.m., when the hourly consumption is 28 U. S. gal. of gasoline and 1.2 U. S. gal. of oil. The speed is not to exceed 1800 r.p.m. In general arrangement the engine is similar to older types of the same make, but it has four carbureters. The exhaust is either carried over the top plane or direct through short collectors slanting outward from the body. The nose of the fuselage is formed by a radiator fitted with shutters over its upper part. Through an opening in the center of the radiator projects the reduction gear of the engine, which reduces the speed of the airscrew to 900 r.p.m.

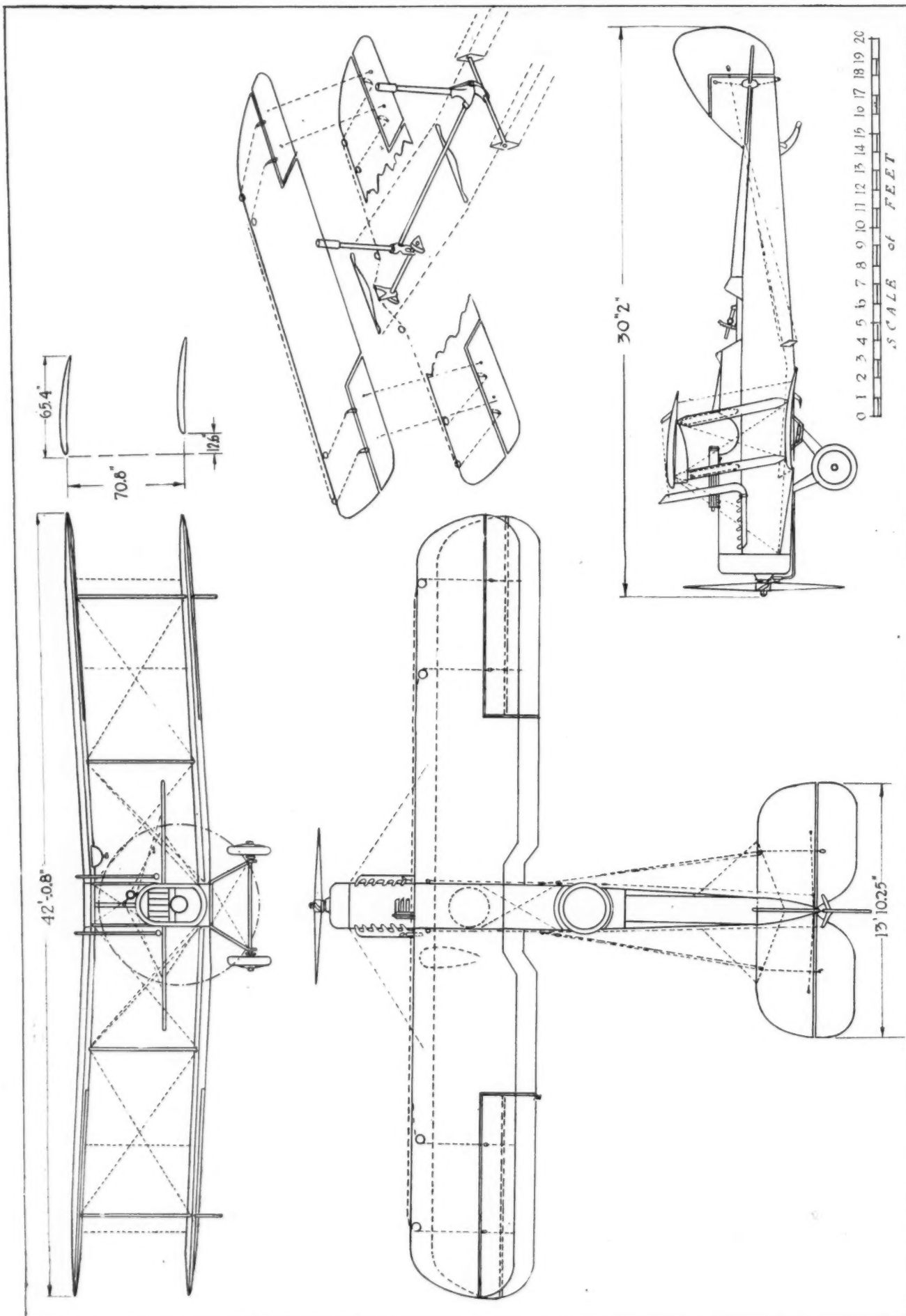
Enough Fuel for 2 3/4 Hours' Flight

Under the front of the body is placed transversely the oil tank, which has a capacity of 5.5 gal. The main fuel tank, which is arranged for air pressure, has a capacity of 68 gal. and is placed behind the pilot's seat. A gravity tank holding 7.4 gal. is placed under the left top plane. Sufficient fuel is carried for a flight of about 2 3/4 hours' duration. In another there is an additional tank holding 20 gal., which brings the capacity up to about 3 3/4 hours.

More recent machines have, instead of the one pressure tank, and mounted in the same place, two tanks placed side by side, each of which is provided with a supply pump driven by a small propeller. With this arrangement a spring loaded valve is provided inside the tank which returns any surplus gasoline to the tank. The two leads from the main tanks and that of the gravity tank are joined at the engine to an omnibus tube, to which is attached a manometer for controlling the tanks.



Details of landing gear



Elevations and plan of De Havilland biplane and sketch of its control connections

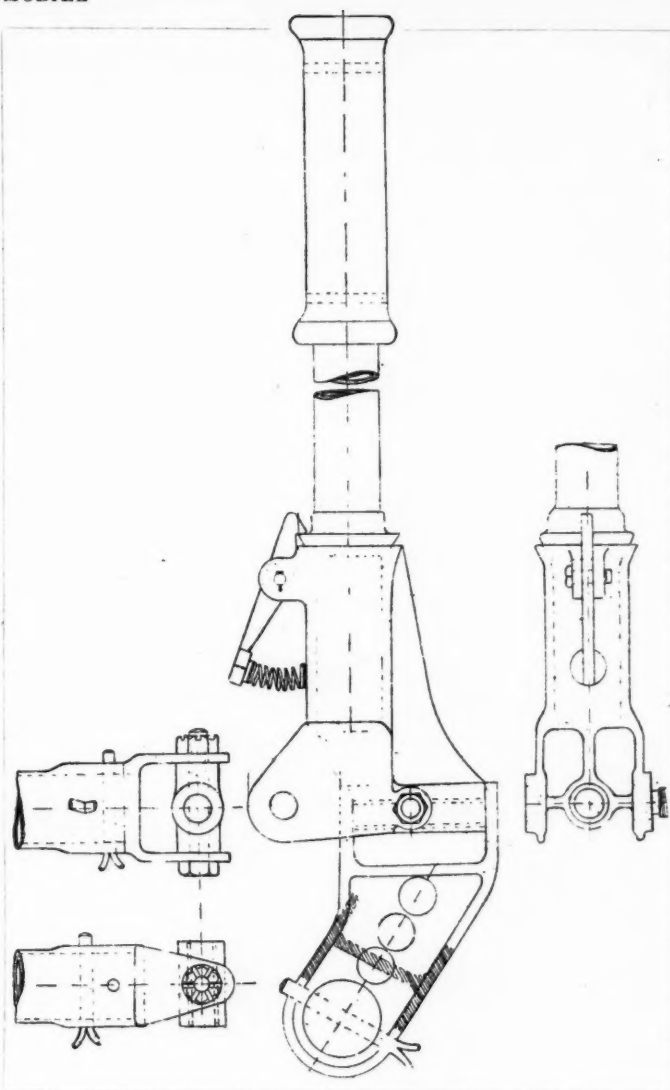
The machine is provided with complete dual control. The control lever of the observer is removable. The wing flaps are interconnected. Their cables run on the outside of the wings along the leading edge. Each wing flap has two crank levers. The upper and lower flaps are connected by two stream line wires. In the same manner the elevator and rudder cables run on the outside of the fuselage. The rudder cables are in duplicate, while each of the elevator flaps has single control cables.

The equipment of the pilot's and observer's cockpits differs in individual machines. On an instrument board in the former, provided with illumination for night flying, are the following instruments: Speed indicator, revolution counter, altimeter, thermometer, clock, hand pressure pump, inclinometer, map board and compass. To the left of the pilot the various fuel pipes are so arranged that the different cocks are within easy reach. On the same side are arranged oil and fuel pressure indicators, a pressure pump fed from the gravity tank, and also on a common axis the throttle, spark advance lever, and mixture regulator for altitude work.

On the throttle rods a catch lever is arranged, so that when the throttle is closed the lever for regulating the mixture at altitudes will return with it. To the right of the pilot are arranged the cables controlling the radiator shutters, the switch for night illumination and a shelf for signal cartridges. Fuel level indicators are not fitted.

In the observer's cockpit are placed a speed indicator, an altimeter, a throttle and a switch for night illumination. Observer's and pilot's cockpits are placed far apart, on account of the main fuel tanks being placed between them. For communication between the occupants there is a speaking tube on the right, and on the left an endless cable passing over rollers in the two cockpits. Behind the observer's seat is the mounting for the camera with adjoining shelves for the slides. The presence of a wireless outfit could not be ascertained in any of the machines. The armament consists of two interconnected machine guns mounted on a turntable in the observer's cockpit and of a fixed machine gun for the pilot mounted on the left of the top covering of the body. The control of the fixed machine gun is accomplished hydraulically by a control mechanism placed immediately behind the airscrew. This mechanism is driven off a pinion on the hub of the airscrew, and releases two shots for each revolution of the airscrew. Firing of the gun is accomplished from the control lever. A spring-controlled hand pump for filling the leads is mounted on the floor of the pilot's cockpit. For loading there is either a lever on the gun or a cable running over a roller, provided with a grip. A telescopic sight is placed to the right under the gun, in front of the rectangular wind screen. As the observer's seat is placed rather far aft a good field of fire is also obtained from here in an outward and forward direction.

The bomb gear, judging from the makeshift way in which the release gear is built, appears to have been added as an afterthought. Bomb racks, either arranged for four smaller or for one large bomb, are placed under the lower wings and under the body. The release is accomplished from the pilot's seat by means of Bowden cable. The cables are either joined at the right of the seat or arranged separately on the outside of the body. A sighting arrangement is built into the body immediately behind the rudder bar. It consists of a square plano-concave glass plate, 13/16 in. thick at the edges and 0.2 in. thick in the center. Underneath this are three wire rods soldered at right angles to a fourth rod lying in the direction of flight. Further down about 6 1/2 in. is another longitudinal rod, and a transverse rod working



Control lever and universal support

in longitudinal slots, and which can be locked in place by screws.

The weight of the machine empty, but including cooling water, was ascertained to be 2440 lb. If the maximum useful load is assumed to be 1300 lb. we obtain a total weight of 3740 lb. As the area is 434 sq. ft., the loading is $3740 \div 434 = 8.6$ lb. per sq. ft. The load per hp., $3740:300 = 12.45$ lb. per hp.

<i>Weights</i>			
	Lb.	Lb.	
Motor	858	Body accessories—	
Exhaust pipes	33	Seats, etc.	17.6
Radiator and water	169	Undercarriage	119
Airscrew	92.4	Tail skid	11
Petrol tanks	61.6	Controls	20.9
Oil tank	9.9	Wings	460
Engine accessories, leads, etc.	43.2	Bracing	68.1
Body and cowl	385	Armament supports	88
Tail plane—			<hr/>
Incidence gear	5.5		2440.0

<i>Loads</i>			
	Lb.		Lb.
Crew	330	Photographic outfit...	22
Armament	162	Wireless arrangement..	11
12 bombs, about.....	317	Fuel	452
Estimated useful load			1300 lb.
Weight of wings			1.06 lb. per sq. ft.

Grease vs. Oil for Chassis Lubrication

Manufacturers Vary Widely in Opinion and Changes Are Frequent—Some Have Changed Back and Forth—Grease Under Pressure Desirable

DURING the winter of 1917 and the spring of 1918 a rising demand for oil chassis lubrication was noted. The idea of using oil lubrication from a central source of supply so that the individual bearing points would not require attention has always been attractive. The interest of every engineer in the industry was aroused by the system used on the Fergus car, in which the springs, shackles and other important bearing points throughout the chassis were lubricated from a central supply system. This system immediately reopened the controversy as to the comparative merits of oil and grease for lubrication, with the result that a considerable impetus was given to the adoption of oil for chassis lubrication. This demand for oil lubrication, particularly on the spring or shackle bolts and other points about the chassis customarily lubricated by grease cups, led to the use of oil cups in a great many instances. Now there has been a reaction, and a few of the manufacturers are considering whether it is not advantageous to use grease under conditions which eliminate the obvious disadvantages.

Pressure Impossible with Oil

One of the fundamental difficulties with oil lubrication is that it is impossible to maintain pressure on the bearing surfaces; that is, the oil cannot be fed under pressure unless there is some sort of circulating system such as is used in the engine. If the oil were to be fed by pressure to bearings such as those of the shackle bolts the whole supply would soon be lost unless there was some means of trapping the oil working through the bearing and recirculating it. As this is impossible, or

at least impracticable, the feed had to be by gravity or by capillary attraction or some other means which, to say the least, is not positive.

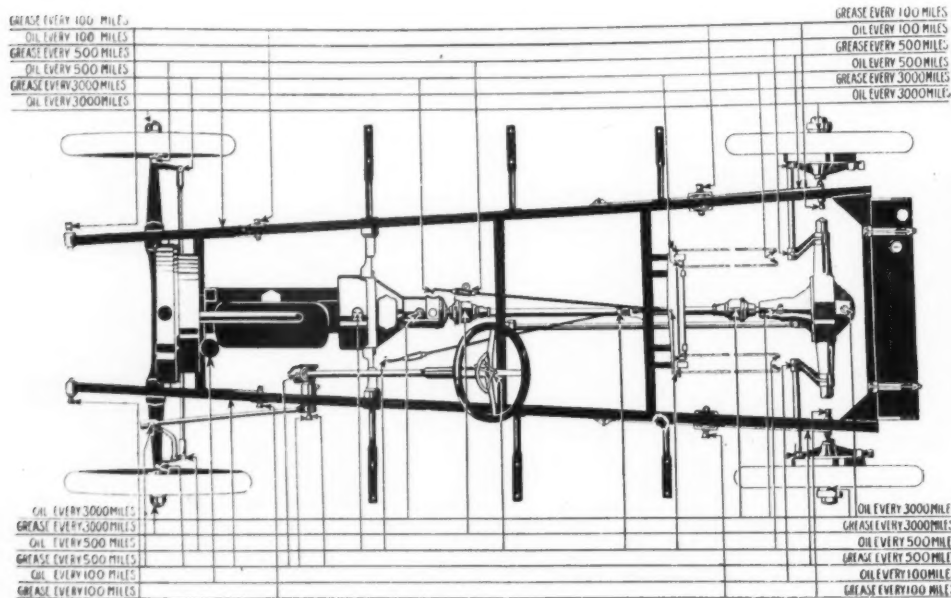
It is doubtful whether a feed of this kind is capable of maintaining the desired film, particularly with the rather heavy body oil necessary to take care of the conditions at certain points.

Grease has been used in bearings of this kind in preference to oil because of its ability to withstand pressure. Thin oil is useless if it is subjected to a very high pressure owing to its tendency to be squeezed out, or at least concentrated into the depressions of the metal surface, leaving the high spots exposed to wear.

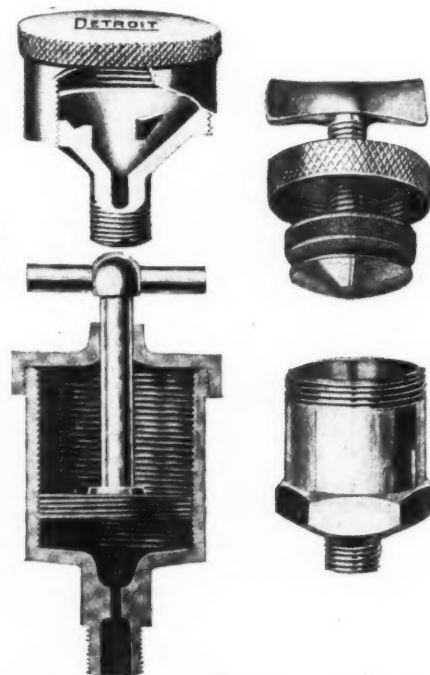
Grease Better if Film Is Maintained

The chief advantage of oil as a lubricant is its fluidity. Because it flows so easily, oil can, of course, reach all parts of the bearing, but it is not this ability to flow which prevents friction. It is the greasiness, or what may be termed "oiliness" of the oil which prevents friction. With this in mind, it is obvious that where it is possible to feed or use grease for lubricating purposes and to positively maintain the film it is best to use grease.

Were it not for the fact that lubricating systems for trucks, passenger cars and tractors had to be so arranged that a temperature variation of possibly 100 deg. will be taken care of, the difficulties would not be so great. An oil of



Lubrication chart of average passenger car chassis, showing points where oil is used and where grease is used



Left, above—Patent type of grease cup in which grease is fed from a paper cartridge. Below—Section through ordinary type of grease cup. Right—Screw compression grease cup for feeding grease under pressure

the correct body for the particular job should be selected and used continuously. This cannot be done, however, in the case of a vehicle which operates outdoors. It is, therefore, necessary to combine the qualities of fluidity with those of greasiness or oiliness, as it may be called, in order to secure the correct kind of a lubricant to flow into the bearing and to lubricate it after it gets there.

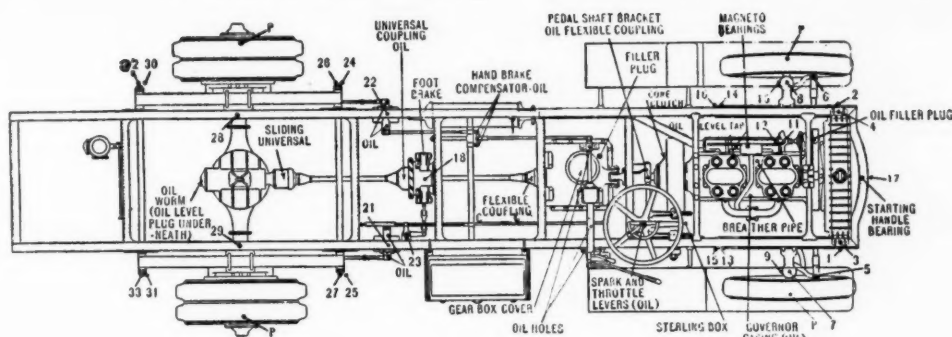
It must be remembered that fluidity, the property which causes oil to move into or through a bearing, also causes it to run out of it. Therefore, a lubricant such as grease, which stays wherever it is put, or at least tends to stay where it is put, has a marked advantage if it is possible to put the grease at that particular point. For this reason the use of grease cups in which the lubricant is introduced under pressure is attracting attention from engineers at the present time. The Packard company has recently introduced a number of pressure grease cups over its chassis to take care of conditions of this nature.

A perfect bearing, perfectly lubricated, would last forever. Perfect lubrication means the spreading of an unbroken film of lubricant between the bearing surfaces. When this film is broken the bearings come into metallic contact, and when bearings come into metallic contact wear takes place. The reason for a lubricated bearing wearing out is that the plane of the bearing surface does not coincide with the plane of the moving surface. In other words, the planes are not parallel. This break in the condition of parallelism, due to depressions in the bearing line surface or to projections from that surface, establishes a condition where it is impossible to protect the two surfaces by an oil film, and the result is that wear takes place. In other words, wherever the oil film is unbroken there is no wear.

Difference in Films

The film established by oil lubrication and that established by grease lubrication are different. A microscopic view of a bearing lubricated by oil shows that there are two coats or films, one on each bearing surface. The friction is not between metal and oil, but between these two films of oil. On the other hand, the microscopic view of a grease lubricated bearing shows that there are three such films. One on each bearing surface and one between the two. The result is that a grease lubricated bearing has a third, extra cushion, which is one of the factors in securing more perfect lubrication.

It has been frequently asserted that a grease-lubricated bearing in winter time simply cuts a path for itself through the grease and lubrication ceases. This is a condition which may exist; but when it does, it means that the choice of lubricant has been faulty and compensation for winter temperature should have been made in the choice of the lubricant. To advantageously use grease on a bearing which has a heavy load to sustain it is necessary that the grease be put in under pressure. The only way that the grease can be put in under pressure is by means of a pressure cup or gun, which seals the grease against leakage of the plunger used to force it in. Some ingenious methods have been devised to accomplish this result; it is not the purpose of this article to mention these, but rather to give an outline of conditions which must be met in handling the lubricating question.



Lubrication chart of a truck using oil lubrication throughout with no grease cups

At the present time there are two main kinds of grease. One is produced straight from a crude petroleum, the other is a manufactured product, being a combination of mineral oils and tallow soap. The first kind are natural greases, which are nothing more or less than crude petroleum products and have been found to be quite satisfactory for most purposes, but are not always capable of withstanding large ranges of temperature. That is, they are either too soft to start with or under conditions of low temperature they are apt to harden excessively.

The manufactured greases vary in consistency from a heavy oil to practically a solid. The soap merely acts as a flux to bind the material together. That is, the soap is used as a binder for the mineral oil products. These two schools of grease manufacture have various arguments, and the question is one which is too large to come within the scope of this item.

Manufacturers in Doubt

That the entire subject is one which has opened up a wide difference of opinion is quite evident from the number of times which certain manufacturers have changed from grease to oil and back to grease again for chassis lubrication. It is admitted that grease, when applied by the usual paddle method, is a dirt catcher, and unless the person greasing the car is very careful he is apt to introduce a considerable amount of dirt into the bearing along with the grease. On the other hand, grease, when squeezed into place, is a natural protector of the metal and tends to hold its film against heavy pressure. Oil is not always suitable except for very fine or delicate bearings, and the heavy oil which must be used as a substitute for grease is subject to limitations of flow, as well as to differences in its consistency due to variations in temperature. Undoubtedly, if a central lubricating system could be worked out either for oil or grease, a big accomplishment would have been made.

Regenerated Rubber

OBJECTS made of a new regenerated rubber product, called agatit, were shown by Professor M. Le Blanc at the April meeting of the Bunsen Gesellschaft. This product has been worked out in the institute for physical chemistry of the University of Leipzig, by Le Blanc and Lüttke, in conjunction with industrials. It is supplied either in a fine emulsion or colloidal solution, which is convenient for many applications, or as a solid. The latter is much used, it was stated, in packing for condensers and on U-boats. It also serves as a substitute for leather, and is in one respect superior to rubber for this purpose, because it can be nailed and sewn, which is important for sole leather. Rubber gloves for medical men and feeders are also made entirely or largely of agatit. It was mentioned that rubber gloves were hardly obtainable at all in Germany now, while these new gloves only cost 2.50 marks; it is doubtful, however, whether this figure meant the estimated cost of manufacture or the sale price.

Electric Heating and Heat Treating*

The Advantages of the Electric Furnace for Forge Shop Use—Uniformity of Heating—Minimum Production of Scale—A Reduction in the Percentage of Imperfect Forgings

By T. F. Baily

IT is only at a comparatively recent date that the heating and heat-treating operations incident to the manufacture of forgings have been considered with the seriousness which they require. A careful investigation of defective work and trouble with materials generally, has prompted the manufacturer to give more attention, not only to heat-treating furnaces and their shortcomings, but heating furnaces as well.

It is a well known fact among steel forgers that if steel is heated to too high a temperature, a so-called "burning" takes place, which is essentially an overheating of the steel, so that the occluded gases expanding in the plastic metal make the steel very porous, and in such a condition that no amount of forging or subsequent heat treating will correct this defect.

In addition to this, a great deal of trouble has been experienced by overheating the steel on the outside, due to too rapid heating. This is a common fault with particularly fuel-fired furnaces, and it is not an uncommon thing to see billets taken out of the furnace, whose exteriors are dripping, and whose interiors are still hard and difficult to handle in the dies.

The ideal conditions, of course, in heating a billet for forging, is that the metal is uniformly heated throughout, and have a minimum scale or oxide on the exterior. This is difficult to do in a fuel-fired furnace, owing to the fact that all fuel-fired furnaces, in order to obtain rapid heating, must run with a sharply oxidizing flame, and the oxidation or scaling caused by this flame may amount to as much as five per cent of the metal, in extreme cases.

The electric furnace offers an ideal heating medium for steel, as it is not necessary to carry such high ruling temperatures for a given heat desired in the metal, and the furnaces themselves operate normally with a reducing atmosphere at all times. There is, consequently, a saving in metal due to the lack of oxidation, which, in extreme cases of say 5 per cent loss on steel worth \$80 per ton, would amount to \$4 per ton of metal heated.

In addition to this, the steel being in a much better condition when it goes to hammer or press, due to the absence of scale, there is less wear on the dies and less danger of the dies being filled up with scale from the forging itself, as it is sometimes difficult, even with air blast or steam jet to keep the dies entirely free.

*Paper read before the American Drop Forge Association.

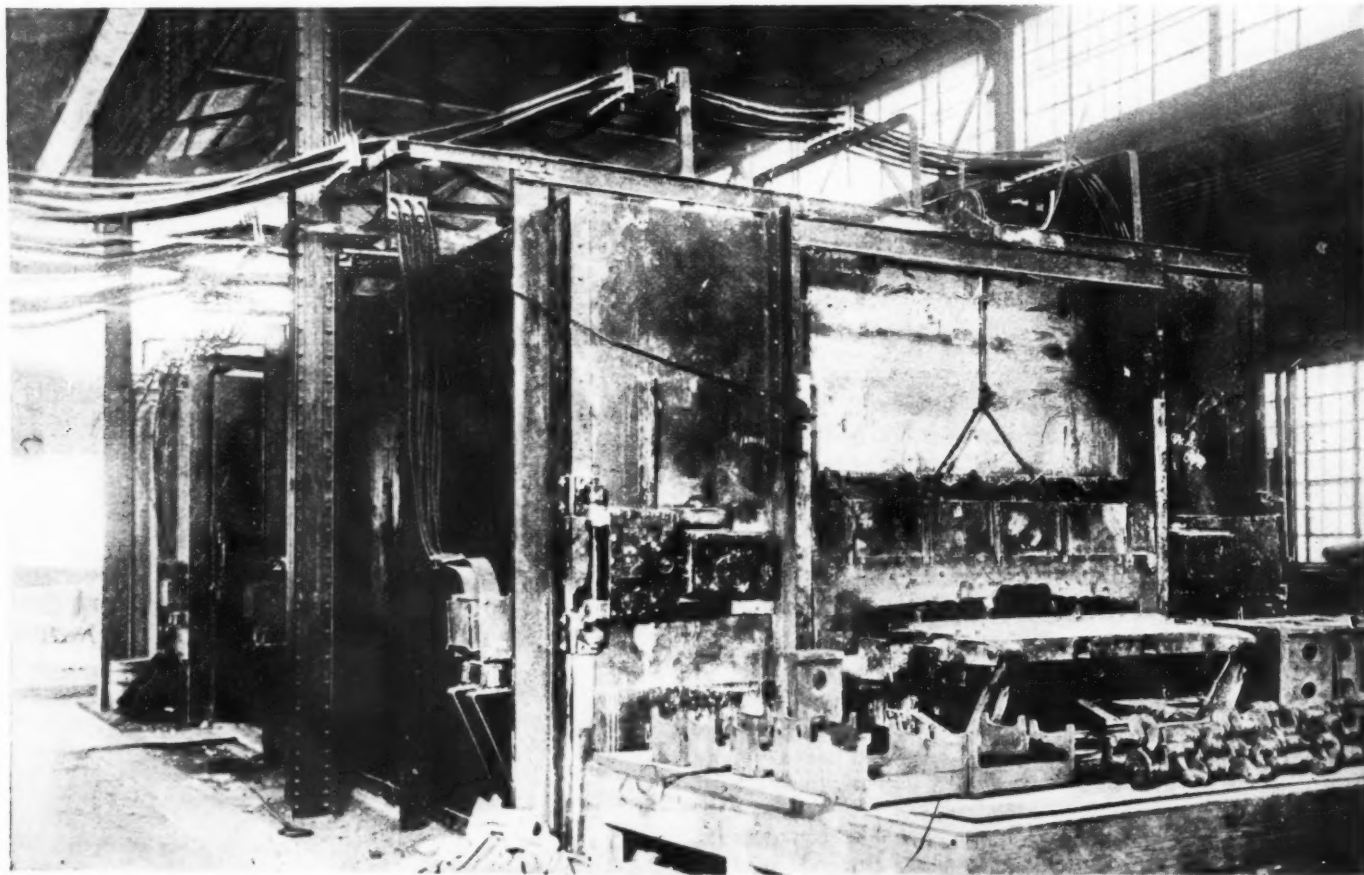


Fig. 1—A 900-kw. electric furnace for heat treating crankshaft forgings. Operating at full capacity it will heat 3 tons to 1650° Fahr., and draw at 1000° Fahr. after quenching in one hour

In addition the electric furnace is bound to reduce the number of defective forgings, some of which are always caused by improper heating, either from the wasting away of the steel if left too long in a fuel-fired furnace, or to a hard center, so that the steel does not flow well in the dies.

The question of the adoption of electric furnaces for the heating operations resolves itself then largely into a matter of cost, and this may be summarized as follows: Table 1 is a typical running sheet on an electric furnace of 600 kw. capacity heating 3¼-in. round billets for forging into 3-in. naval shells.

It is to be noted that the average current consumption per ton is a little less than 260 kw.-h.; but, taking as a basis, a figure of 300 kw.-h. per ton to cover delays and starting up this type of furnace, and with current at one cent per kilowatt-hour, the cost of heating for electricity would be \$3 per ton. The renewals and repairs should, in no case, exceed that of the fuel-fired furnace; and, due to the non-oxidizing atmosphere of the furnace, and the elimination of the sharp cutting flames, these repairs should average, in practice, much less.

Against this charge of \$3 per ton for electric furnace operation should be taken the fuel oil for a similar furnace, which, when operating on substantially 2 tons per hour, would approximate, in the average plant, at least 50 gal. per ton; and in direct-fired non-continuous furnaces this figure would be considerably increased. But even at a fuel consumption of 40 gal. per ton, and with oil at 5 cents per gallon, this charge would be at least \$2 per ton. Thus, if the metal loss on \$80 steel should be over 1¼ per cent, or \$1 per ton of steel heated, the cost of electric furnace and fuel-fired furnace operation would be the same, with the exception of the better class of work done by the electric furnace, which would make a greater saving, due to the production of a higher percentage of good forgings put through the furnace and press.

On the 600-kw. furnace the difference in metal loss is some-

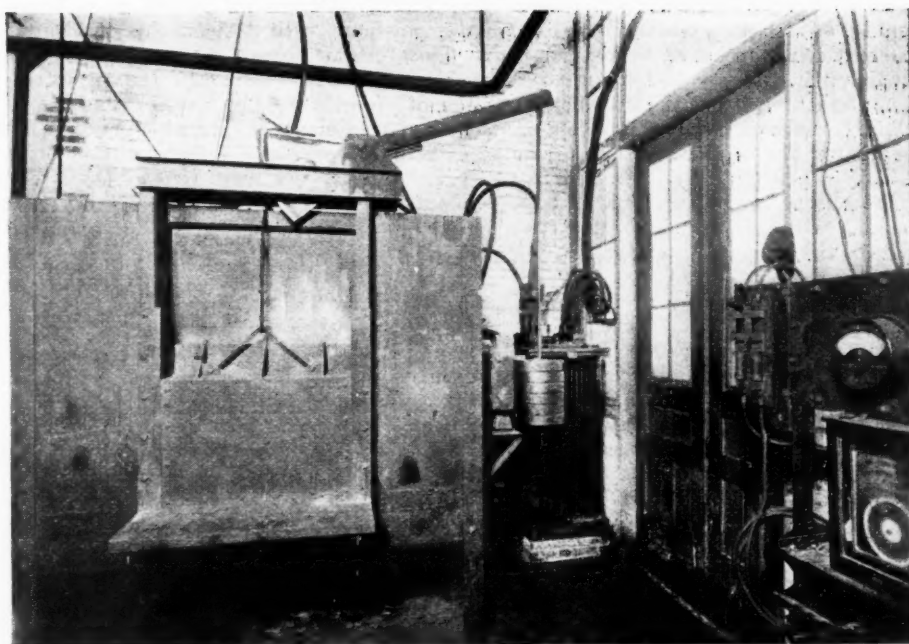


Fig. 2—A small electric furnace used in heating gear blanks, capacity 200 lbs. per hour to 1650° Fahr. using 40 kw. per hour

what over 5 per cent, and the reduction in the number of pierced billets rejected, due to eccentricity is such that in this item alone there would be at least 5 per cent more forgings by the electric furnace heating, due to the more perfect heating of the billets.

The heat-treating of forgings is a matter that has already been given a great deal more attention in the production of forged material than the heating just discussed, as the limitations in temperature and furnace conditions are more thoroughly known, and a variation of even 25 deg. in the heating, or more especially in the drawing temperature, makes a very noticeable and decided change in the physical characteristics of the piece.

There are perhaps no more exacting requirements in forging than those of gears for automobiles, and in this connection the furnace shown in Fig. 2 will be of interest. This furnace is the smallest type built and has a capacity for heating

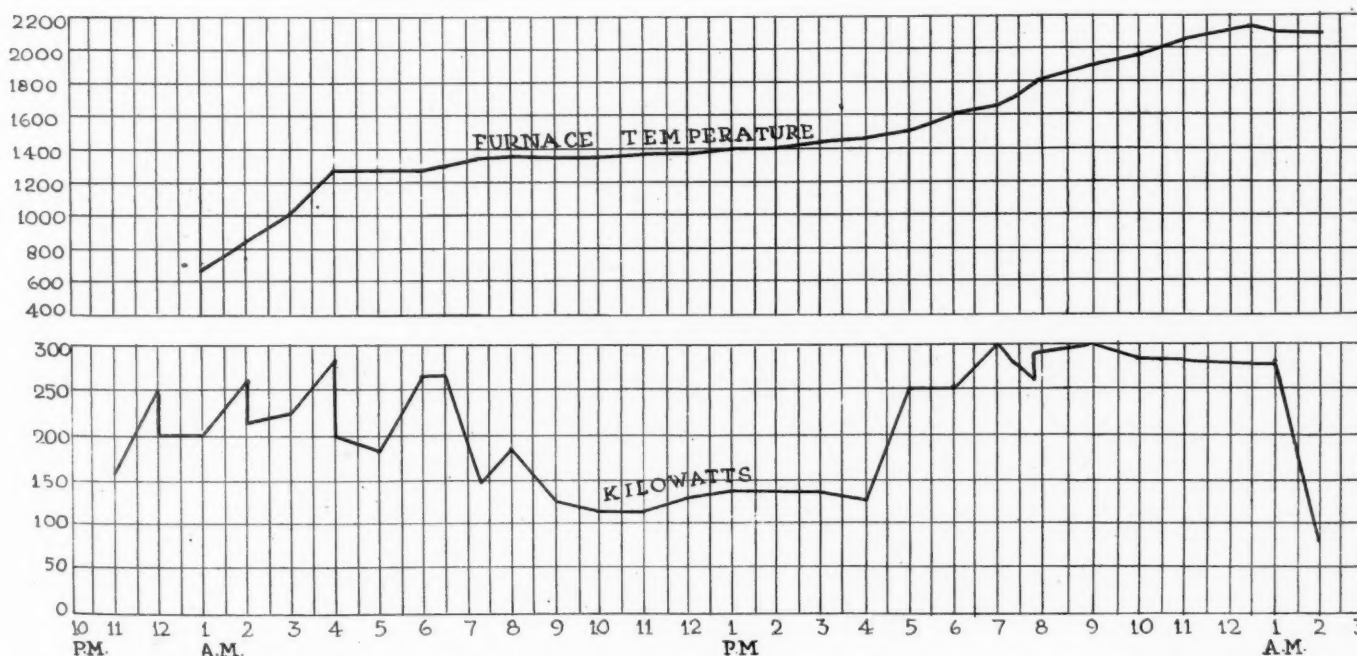


Fig. 3—Relative variations in furnace temperature and kilowatts used in run of furnace recorded in table on page 190

Rest Rooms in a Large Ignition Plant



THESE photographs show the interior of three of the rest rooms for women in a large plant devoted to the manufacture of ignition, starting and lighting apparatus. The welfare work of this plant is in charge of a committee composed of the forewomen of the different departments in which girls are employed. In each rest room there is a matron whose duties are to attend to the needs of the girls, to give out aprons, and to see that the privileges of the room are not abused. It is considered, in this plant, that a room approximately 30 x 65 ft. is necessary for 150 girls



The Patent and Trade Mark Laws of the Argentine*

Three Kinds of Patents Obtainable for Terms of from 5 to 15 Years—Novelty a First Essential—Priority of Trade Mark Registration in Most Cases the Only Requisite

By R. W. Huntington

A LARGE amount of misinformation regarding patent and trade-mark conditions in the Argentine Republic has been published or otherwise disseminated in the United States. The principal cause, however, of false impressions regarding patent and trade mark conditions in that country lies in the fact that many persons fairly well versed in similar matters in their own country jump to the conclusion that they must be the same everywhere. In patent matters in the Argentine the value of international jurisprudence is modified to a considerable extent by local legislation.

Another cause of confusion is the fact that Argentine patent and trade-mark laws are based on entirely different principles.

In the United States up to the present date about 1,300,000 patents have been issued for inventions and designs, and about 120,000 trade-marks have been registered. In Argentina on the other hand, since patent No. 1 was issued on Dec. 1, 1866, up to the present time, approximately 14,500 patents have been issued, and, since Dec. 27, 1876, when trade-mark No. 1 was registered, something over 52,000 trade-mark registrations have been made. That is to say, in the United States the ratio between the number of patents and trade-marks is more than ten to one in favor of patents, while in the Argentine Republic the proportion is about $3\frac{1}{2}$ to 1 in favor of the trade-mark.

There is a reason for this inversed proportion in the two countries. In the United States as in Argentina, inventors' rights are based on priority of invention; whereas in the matter of trade marks, the laws of the two countries are diametrically opposed in principle. In the United States the mere fact of priority of registration does not hold against priority of use of a trade mark, so that registration is not necessary, although advisable, in order to protect the rights of the user of a brand. In Argentina, on the other hand, previous registration does prevail as against previous use, and for this reason it is absolutely imperative to register every trade mark used, and to do it before offering to the public the goods on which it is to be used.

Argentine Patents

According to the Argentine Patent Law (No. 111 passed by Congress on Sept. 28, 1864 and signed by President Mitre on Oct. 11 of the same year) there are three kinds of patents, i.e.,

- 1—Patents of Invention;
- 2—Additional Patents;
- 3—Precautional Patents.

Patents of Invention are issued for 5, 10 or 15 years, the first two terms at applicant's option, and the latter or maximum term only to very important inventions originating in Argentina. The limit of time given to a patent for a foreign invention is 10 years, which can usually be obtained, always provided the foreign patent does not expire before the expiration of that term. The patent is not renewable on expiration of the term for which it is originally granted unless for reasons of force majeure the patentee is prevented from working the invention. Even in such cases the extension is

not provided for by law, but must be petitioned for administratively, and it has been granted in a very small number of cases. It is quite within the bounds of probability that some interesting cases of this nature may arise from conditions produced by the present world war.

Additional Patents are granted for improvements on an invention, already patented. They expire with the original patent unless granted after more than one-half of the term has expired, or if the improvement gives a reduction of more than one-half of cost or time of production, personal or property risks, or analogous results, in which case the Commissioner of Patents may decide what extension of the term may reasonably be granted. An additional patent may be taken out either by original patentee or by others, but in the latter case a royalty must be paid to the owner of the original patent, the amount of which is fixed either by mutual agreement or by the decision of the Commissioner of Patents.

Precautional Patents are popularly supposed to protect a partially developed invention until such time as it may be perfected when it may be converted into a regular patent. If this were really so, it would be similar to the United States "Caveat"; but the fact is that the law provides that if a second applicant applies for the same invention while it is covered merely by a "precautional patent," the two applicants are brought together and unless they come to an agreement no patent is granted to either of them; hence, this class of patent is only applied for by inventors who do not avail themselves of expert counsel.

In general, however, the Argentine Patent Law is good, and the protection afforded by a patent properly drawn up and based on real priority of invention, is ample. The punishment for infringement is sufficiently severe, including both fine and imprisonment besides the suit for damages which may arise out of the case; so that usually a simple admonition is enough to stop the repetition of the infringement.

Novelty an Essential

A very general misapprehension exists arising from confusion of the patent with the trade mark laws, to the effect that a valid patent may be obtained by anyone, on an invention known and even patented in another country. Such a patent can only be obtained by false declaration as to novelty, and if an attempt were made to sue for infringement on it, a petition for annulment based on the production of published proof of previous public knowledge of the invention in any other country, would be successful.

The only valid patent based on a foreign invention is one which is applied for by the foreign patentee or his heirs or assigns, before the invention is worked in this country.

Many of the principal manufacturers of the United States are now aware of the importance of patenting their rights in Argentina before offering the patented article for sale here; since, if the article has already been manufactured here, or even sold either by the foreign patentee or any other person, such manufacture or sale constitutes previous public knowledge, and the foreign patentee would be barred from preventing such manufacture or importation, both of which might have been successfully avoided by applying for the confirmation of the foreign patent in time.

*Abstract of a paper read before the American Commercial Club of Buenos Aires.

A small annual fee is due on each patent granted, excepting additional patents, and in order to keep the patent valid, besides the payment of these annuities, the invention must be "worked," i.e., either manufactured or offered for sale in this country, within two years from date of grant, and such working must not be suspended during any subsequent period of 2 years.

Argentine Trade Marks

We now come to a phase of my subject which is of more general interest to merchants.

As previously stated, the Argentine Trade Mark Registration law is not based on the same principles as the Patent law. The fact that priority of registration is in most cases the only requisite to hold a trade-mark, and the additional fact that the law does not require the registrant to prove the fact that he is using the mark in order to register it, (as is the case in the United States) nor even to use the mark once registered, give the law a scope which in all probability was far from the intention of its legislators. While the object of such laws in all countries is to give protection to manufacturers and merchants in the use of their distinctive brands or emblems, the interest of the public in general is paramount in all legislation, and there is no doubt, not only that the public is not properly protected against imitations, when any person may register a well-known foreign brand and not only prevent the originator of the same from using it but also sell an inferior article under its name, but it is also a well-known fact that the law lends itself to a traffic in trade marks, thus making an article of commerce of what should be a protection to commerce.

Aside from this defect, the law is good, but in this particular it cries to heaven for amendment.

In the meantime, we must take the law as we find it, and like the patent law, it is a satisfaction to know that it is fairly administered by the authorities of the Argentine Patent and Trade Marks office, who nevertheless, like ourselves, must abide by it so long as it stands unamended or unrepealed.

There is only one alternative in view of the existing circumstances, and that is to apply for the registration of a trade mark before offering for sale any goods bearing it. This is so generally recognized by merchants here, that it is the usual custom to register all marks of any new goods received, not to defraud the manufacturers, but to prevent unscrupulous parties from defrauding them as well as the merchant. I could tell you of numberless cases in which reputable Buenos Aires houses have so done, advising the foreign manufacturer of their action and of its reason; but in the majority of cases the reason appears so absurd to the manufacturer that it is disregarded, and in some cases it even brings the merchant under suspicion, so that many have discontinued the custom of advising the home manufacturer for this reason. Now this may be all very well so long as the registration remains in honest hands, but an arrangement should in all cases be made between the manufacturer and the agent or merchant, to protect the former in case of the possible death or bankruptcy of the latter, in which case all trade marks registered in his name would be considered as an asset of the business, and might even be sold at auction, as has been done in several cases.

A notable exception to the general rule of the predominant value of previous registration, is the fact that according to the Argentine Law, personal surnames and portraits are protected. This rule is very strictly carried out by the Trade Mark Office, and when such names or portraits have been registered, it has always been by misrepresenting them as arbitrary or fictitious. When you hear of a foreign firm having been able to obtain redress in the Argentine courts for the improper registration of their names by unauthorized persons, you will find on investigation that it has been for this reason. But even in such cases, subterfuge has in some cases been resorted to by producing an individual of the desired name, making the petition in his name and assigning it afterward. This phase of the question is hard to avoid, as are legal subterfuges everywhere.

The Things That Are Registrable

The Argentine Trade Mark Law (No. 3975, enacted Nov. 23, 1900, and which revoked all previous legislation) is now

what we must abide by in the registration of trade marks. By its enactments, the subject of a trade mark in general is similar to requirements in the United States, with the notable exceptions that proper names and geographical words are registrable, under a special form. Combinations of numerals are also registrable. The form given to the product itself is not registrable, but any novel form given to a container, if only for the purposes of identification and not of utility, may be registered to cover the class of goods sold in the container.

The registration is for the term of ten years, and is renewable indefinitely for like periods. The entire amount for the registration must be paid on filing the application, so that no subsequent payments are required until the time for renewal, when the matter is treated in all respects like a new application. If the registration is rejected, applicant may either substitute another mark by paying the additional expenses of publication, etc., or petition for the return of the payment made, except that portion of it which has been disbursed for reglamentary public notices.

About ten days after filing, the application and facsimile of the mark is published in the *Boletín Oficial* for five consecutive days, and within thirty days from the last day of publication anyone deeming his rights to be aggrieved may file a protest. Unless in cases of evident fraud, however, this protest is useless unless based on a previous registration or the fact that the mark applied for contains the name or portrait of the person so protesting.

Afterward, the office makes a search, and if no objection is found, the mark is granted, at present about five months after application, varying according to the volume of applications presented at the office.

Infringement Penalties

The penalty for imitation or infringement of a registered trade mark, like the case of the patent law, includes a fine and imprisonment, and the latter may not be commuted to a fine. For this reason, suits of this nature are very much dreaded, and it is not pleasant to become the defendant in such a case. The articles constituting the infringement are subject to seizure and sale in benefit of the Public Education Fund, and the defendant, if condemned, may be liable to a further civil suit for damages.

The names of firms, companies, merchants and manufacturers engaged in business in this country and duly registered or licensed as such, are protected by law without the necessity of registration as trade marks; nevertheless, they may be so registered, and since in the former case opposition must be made within one year from the time when a rival house with a similar name begins to do business under such name, while in the case of a trade mark the term for prescription of action is three years, or one year from the time when the facts came to plaintiff's knowledge, the advantage is evident and such registration is quite usual, even by local houses. In the case of foreign houses it is very necessary, since they do not enjoy the common law protections above mentioned.

Quite recently a new registry has been inaugurated within the Trade Mark Office, for such firm or company names, and for other designations applied to business houses rather than to their goods. This is available, however, to houses established here only, or to foreign houses with established agencies in this country.

Quite a general impression seems to exist that a radical change has taken place in Argentine trade mark legislation. This is not true. The law remains unchanged. It is true that in 1912 a new classification was adopted and the ruling made that each class must be registered separately, since previously it was possible to register a mark for all classes of goods for a single fee; while more recently another ruling has added the cost of advertising to the expenses of registration, and still more recently the new stamp law has even further increased the cost, especially in the matter of the legalization of the power of attorney. Furthermore, a few isolated decisions of the Chamber of Appeals have appeared almost to reverse its former sentences in the sense of being more favorable to foreign interests; but one swallow does not make a summer, nor does one sentence make jurisprudence, especially when in opposition to the great mass of decisions; and it will be safer to view the law from the standpoint of the prevailing mass of jurisprudence.

Doman Tractor Engines

Made in Three 4-Cylinder Models to Suit Practically All Power Requirements—
All Cylinders Are T-Head and Those of the Smallest
Model Are Cast in Pairs

THREE models of tractor engine are being manufactured by the H. C. Doman Co., Oshkosh, Wis. They are all of the slow-speed, heavy-duty type and were specially designed for tractor work. Each of the important features of design was given an exhaustive study before it was decided upon. Thus, for instance, although the T-head type of cylinder is somewhat more expensive to manufacture, the company has held to this type because it affords the opportunity to secure perfect water circulation all around the valves and to use valves of larger diameter, thus insuring the highest volumetric efficiency. As regards the grouping of the cylinders, the unusual wear of cylinder walls in tractor engines has been the deciding factor. If all four cylinders were cast in a block, any damage to one of the cylinders would prove exceedingly expensive. Therefore in the two larger sizes of Doman engines all cylinders are cast separately, whereas in the smaller size the cylinders are cast in pairs.

It is undisputable that a low-speed engine will outlast a high-speed engine, and in view of the fact that in tractor work engines are required to work under considerable load all the time, the Doman company has designed its engines to operate at comparatively low speeds of revolution. These engines are designed to develop their best efficiency at from 600 to 900 r.p.m., and it is the belief of the Doman company that a tractor engine should not operate at more than 900 r.p.m.

The illustrations herewith are of the small size, a four-cylinder engine of 4 1/4 in. bore by 6-in. stroke, rated at 25-35 hp. This engine is designed for use on a three- to four-plow tractor. The piston displacement is 425 cu-in. and the weight complete of the engine is 800 lb. The cylinders are cast in pairs, of close-grained semi-steel and are of the T-head type with an unusually large water jacket around the valves. The cylinders are ground to size and are tested for leaks under hydraulic pressure. It will be noted from the sectional view that the cylinder heads are cast integral with

the cylinders, and there are large openings in the water jacket heads which are closed by plates to which the water return pipe is bolted. Pistons are made of semi-steel and are turned down to size. The wristpins are made of low-carbon steel, case hardened. They are hollow, are ground to size on the outside and are secured to the connecting-rod by a clamping bolt which passes slightly beneath the surface of the pin so as to prevent longitudinal movement of same.

The connecting-rods are drop forgings, of I-section, and are heat treated. The caps are secured by means of four bolts.

All crankshaft bearings are 2 3/4 in. in diameter. The crankpin bearings are 2 1/4 in. long and the main bearings of the crankshaft are of the following lengths: Front and center, 4 in. each; flywheel end, 4 1/2 in. This gives a total main bearing length of 12 1/2 in. The crankshaft is made from 35-45 point carbon steel, double heat treated and annealed. All bearings are ground to size. The crankshaft and crankpin bearings are die cast of high-duty babbitt, and are backed by bronze. The camshaft is supported in three bearings, of which the forward and center bearings measure 1 5/8 in. in diameter by 1 3/4 in. in length, while the flywheel end bearing measures 3/4 in. in diameter by 2 1/4 in. in length. Hence the camshaft can be withdrawn from the engine through the forward end.

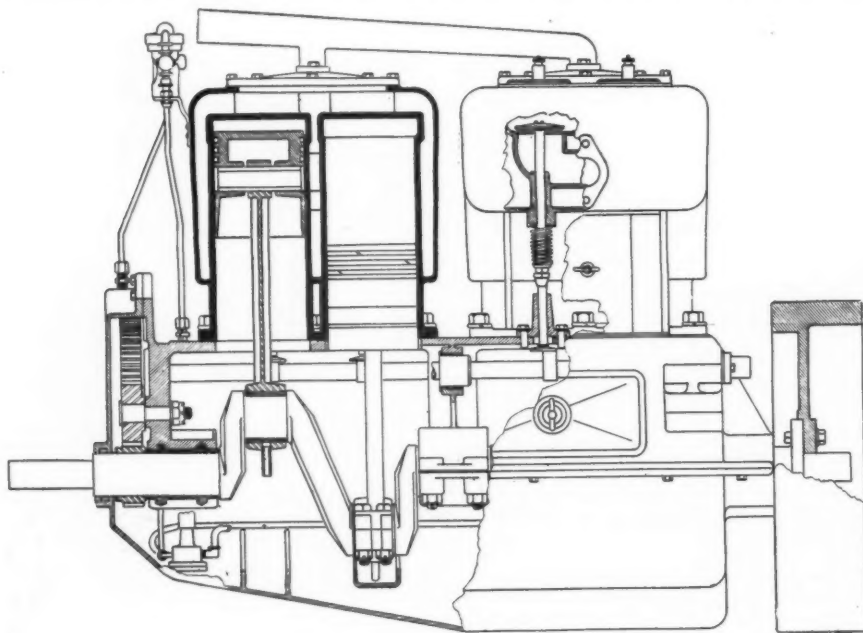
Mushroom Type Cam Followers

The valves have a clear diameter of 2 3/8 in. Their heads are of nickel steel and are electrically welded to the carbon steel stems. Valve operation is by push-rods with mushroom type cam followers. These are offset from the centers of the cams lengthwise so as to prevent the wearing of a groove. The timing gears are of 1 1/2 in. face and cut with 10 pitch teeth.

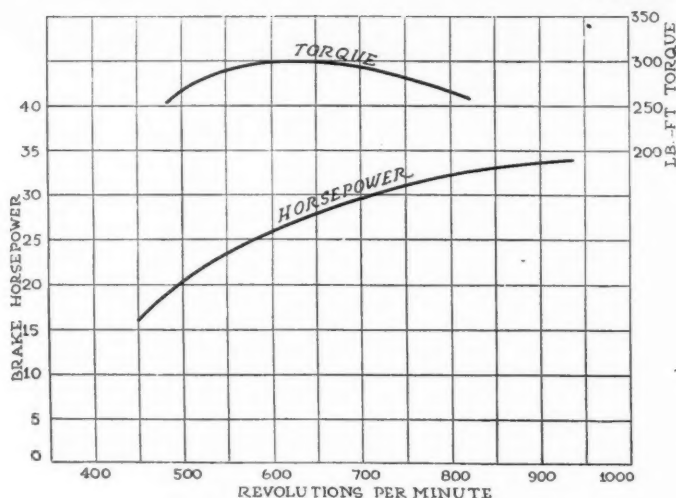
The crankshaft and idler gear are made of 35-45 carbon steel, while the camshaft and accessory drive gears are made of semi-steel. A centrifugal water circulating pump is fitted to the engine, of sufficient capacity to cool it under the hardest working conditions.

The Doman engines are regularly designed for the use of gasoline, but the company has evolved a special exhaust and jacketed intake manifold which can be attached to the engine at a small extra expense. This manifold, it is stated, permits of the use of kerosene with any good make of carbureter. A horizontal fly ball type of governor is fitted, which controls the amount of mixture entering the intake manifold. The governor is inclosed in a dust proof case and is claimed to be non-racing. Ignition is by a high-tension tractor type magneto equipped with impulse starter. No batteries are used.

The crankcase is cast of semi-steel in two sections. All of the crankshaft bearings are supported by the upper half and the lower half contains only the oil troughs and the oil reservoir. There are four large hand holes with cover plates in the upper half of the crankcase, and as there is also a removable cover plate over



Part-sectional view of Doman Type HT engine



Torque and horsepower curves of Type HT engine

the gearcase, all of the working parts are readily accessible. Lubrication is by the circulating-splash system. There is an oil trough under each connecting-rod head, and the oil is circulated by means of a gear pump located under the forward bearing and distributed by means of a distribution pipe with openings opposite each trough. A branch from the distribution pipe feeds oil through a sight feed to the cam gear housing. The valve mechanism is inclosed by removable housings and the whole engine is of neat and trim appearance.

The radiator fan is driven by means of a flat belt off the crankshaft. The spark plugs are located in the caps over the inlet valves and the high tension cables from the magnetos are carried to them through a tube.

The second size of engine made by the Doman company has four 5 x 6 in. cylinders and is rated at 35-40 hp. It is also designed for use in three to four plow tractors. The construction features are much the same as in the smaller engines, except that the cylinders are cast separately and the valve springs are inclosed in tubular housings. The largest size of Doman engine has four 6 x 7 in. cylinders and is rated at 40-60 hp. It is designed for use in 4-6 plow tractors. This type also has individually cast cylinders and sleeve covers for the valve springs.

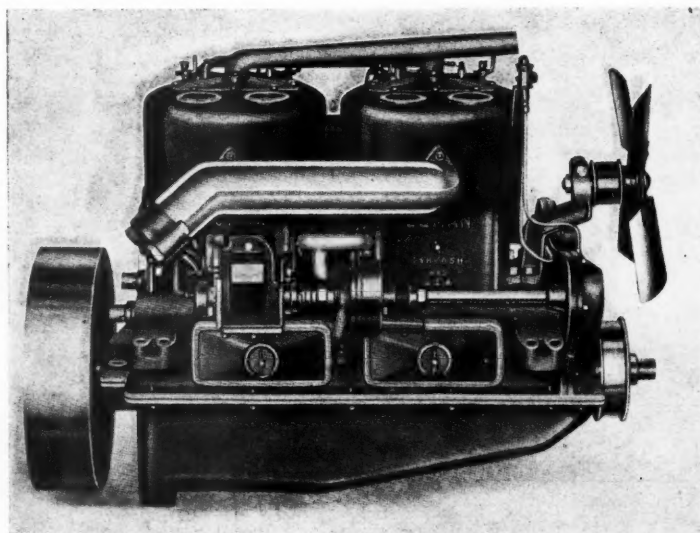
Special emphasis is laid by the Doman company on the finish of their engines. They are first given a heavy coat of filler and are allowed to dry thoroughly. They are then carefully sanded, after which they get a coat of sealer and are again allowed to dry. They are once more sanded before the final coat of enamel is put on. This gives the engines a glossy finish which will withstand heat and oil.

Standardization of Milling Cutters and Small Tools

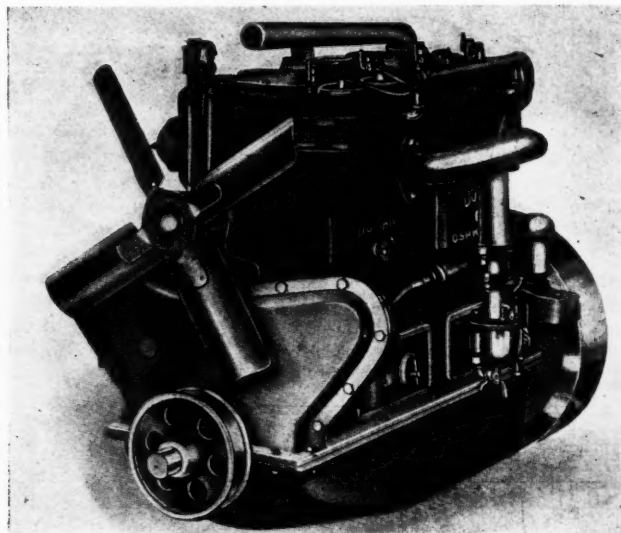
THE British Engineering Standards Association (by which name the Engineering Standards Committee will, in future, be known), at the request of a large number of manufacturers, who have felt that lack of standardization has hampered production and retarded progress, has recently formed a representative sub-committee to deal with the standardization of milling cutters and small tools. The work coming properly within the scope of Colonel Crompton's Sectional Committee on Machine Parts, he presided at a conference, at which the principal firms and associations interested, both makers and users, were present. Representatives were also present from the Ministry of Munitions Small Tools Department and Woolwich Arsenal. The subject was fully discussed, with the result that the meeting was unanimously in favor of standardization being undertaken. The sub-committee is under the chairmanship of R. Dumas, of the British Thomson-Houston Company, and a number of panel committees have been nominated to undertake the detailed study of the subject, as follows: Panel I, Form relieved cutters; Panel II, Non-relieved cutters; Panel III, End mills; Panel IV, Reamers.

On account of the pressure under which the industry is working at the present time, the committee have decided, in order to save the time of the members, that the work shall be carried out by these panels at convenient centers, those selected being Birmingham, Leicester, Manchester and Sheffield. The detailed reports of the various panels will be considered by the sub-committee sitting as a whole. In view also of the large amount of American machinery in England, it is hoped to establish close and direct co-operation with American engineers and manufacturers through the American Society of Mechanical Engineers; Continental practice will, doubtless, also be taken account of. It is quite realized that the work being undertaken, important as it is, will be largely in the nature of reconstruction work, and that the standards arrived at can only be introduced gradually on account of the amount of machinery already installed; yet, on all sides, expression has been given to the desire for such standards to be formulated without further delay, in order that gradually the present unsatisfactory position may be effectually ameliorated.

THE aluminum industry of all countries has been considerably developed since the war started. The annual report of the Swiss company at Neuhausen shows greatly increased output and large profits during the past year. A sum of some \$1,000,000 has been set aside from the gross profits of the year to provide further hydraulic power to extend operations.



Right side view of Type HT



Three-quarter left side view of Type HT

New Axle for Four-Wheel Steer Trailer

Standard Parts Co. Has Standardized Unit for 3½-Ton Design of Trailer with and Without Brakes

THE growing use of four-wheel steer trailers for both military and commercial purposes has led to some ingenious designs of axles for this purpose. By means of suitable axle arrangement it is possible to use trains of trailers of considerable length. One of the recent designs of axle brought out by the Standard Parts Co. is illustrated herewith and shows some novel developments in brake and steering layout.

The meritorious feature of this type of axle is that it is absolutely interchangeable for front and rear, and the axle can be used either with or without brakes and still have a large number of the parts interchangeable. The axle is intended for a four-wheel steer trailer such as is in quite general use at this time. It is intended to have one or two men riding on the trailer, and these men can operate the brakes on the trailer when necessary, thus enabling the train to stop much more quickly than if there were brakes on the rear wheels of the leading truck only.

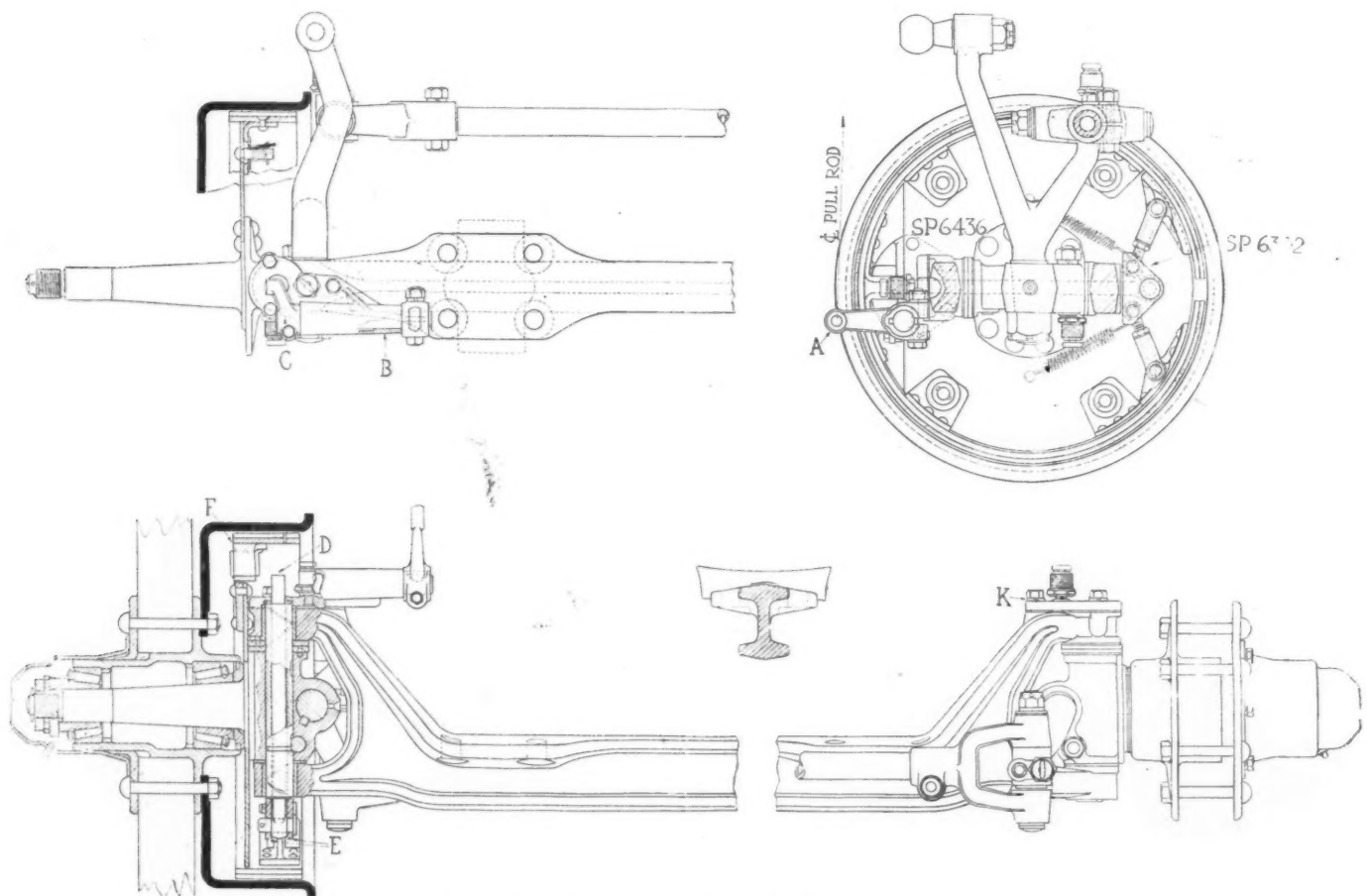
Layout of Brakes

The layout and operation of the brakes is probably the most interesting part of the axle, as it is a matter which is often approached with a great amount of diffidence by designers who fear the unusual combinations of linkage necessary for the operation of front wheel brakes. In the layout shown in the illustration herewith the pull rod operates on the lever *A*, which is attached to the shaft *B*. Pulling on the

rod through the brake lever causes the lever *C* to push down on the pin *D*. This pin is connected to the two equalizing plates *E*, which are in turn connected to the toggle links which expand the brakes. The brake is anchored by a U-shaped bracket *F*. It is apparent that the turning of the knuckle will affect the operation of the brake. It is also to be noted that the steering knuckles can be used on either end of the axle by turning them end-for-end and upside down.

If one of the two axles used on the trailer does not have brakes—and it is the usual practice to put brakes on one axle only—this is taken care of by simply omitting the brake drum and the brake operating parts, but using the same hub, thimble, king bolt, I-beam, etc. This gives a standardized type of axle which makes a good production proposition because of the fact that so many of the parts are duplicated regardless of whether braking is required or not.

WE have received from the Erie Specialty Co., 8 West Fortieth Street, New York City, a copy of the concern's catalog on standard aircraft metal parts. The Erie Specialty Co. was specially organized for the purpose of manufacturing aircraft metal parts, and has built up an efficient organization. The catalog lists the various aircraft bolts, nuts and clevis pins standardized by the S. A. E. A telegram code is given for ordering parts in a hurry.



Interchangeable front and rear axle for trailers

Tractor Operating Cost in the Corn Belt

An Analysis and Tabulation of Data Obtained from More Than 600 Farmers in Illinois—Relative Figures for 2-, 3- and 4-Plow Machines

AN increase in the number of farmers securing profits from the use of tractors is reported in a pamphlet on tractor experience in Illinois issued by the U. S. Department of Agriculture. Tractors do not increase the crop yields, but their advantages lie in labor saving, speed and adaptability for night work, states the report. The tractor has not reduced the number of horses used on farms but is replacing them in much of the work which they formerly performed. Ninety per cent of the tractor owners in Illinois reported profits from their tractors as compared with 80 per cent in the year preceding. Preference for 3-plow tractors was expressed by 76 per cent of the farmers, while more than three times as many 2-plow machines were found in use as 4-plow.

The present report is based on detailed reports from 359 tractor owners in Illinois made during the summer of 1917 and 284 reports made during the spring of 1918.

Inquiring for the principal advantages of the tractor for farm work the Department of Agriculture found that the ability of the tractor to do heavy work quickly is considered the principal advantage. The saving of man labor is next. The ability to plow to a good depth, especially in hot weather, is also emphasized. The availability of the tractor for night work is mentioned.

Under the leading disadvantages, the difficulty of efficient operation is the principal point named. Packing of damp ground is mentioned, as are also expensiveness, delays and inability to use the tractor for some work still performed by horses. That disadvantages are not emphasized to so great an extent as formerly is noted by the Department.

Small farms do not warrant tractors, says the report, but experience shows that where a tractor is purchased for a small farm, the farmer usually increases his farm to meet the capacity of the machine. One-third of the Illinois farmers reported increase of acreage farmed after they purchased a tractor. This is considered especially significant as there has not been a tendency to increase the farms recently excepting where tractors are used.

Three-Plow Type Predominates

The 3-plow tractor outfit predominates, due, according to the Department of Agriculture, to experiences which show that large outfits are not economical for ordinary farm conditions and that the 3-plow outfit meets the requirements in acreage plowed per day and maintenance costs. It recommends the 3-plow tractor even on farms of comparatively small size, preferring it to the 2-plow tractor because the latter does not increase sufficiently the amount of work one man can do and does not, therefore, possess the great advantage of tractors over horses, namely, speed. Moreover the 2-plow tractor does not develop enough power for operating grain separators, ensilage cutters, etc. The average sizes of farms on which the 2-, 3- and 4-plow tractors operate satisfactorily are 180, 250 and 300 acres respectively. The 3-plow and 4-plow sizes seem to meet the best tractor requirements of the average Illinois farm since they enable speedy plowing, reduce man labor and are powerful enough to operate the various machines found on the average farm.

Average Prices

The average prices paid for the three sizes most commonly purchased during 1917, in Illinois, were:

The 2-plow tractor	\$800
The 3-plow tractor	1,100

The 4-plow tractor	\$1,400
The 2-plow plow	115
The 3-plow plow	165
The 4-plow plow	235

Prices at the beginning of 1918, adds the report, were substantially higher than the above.

The life of a modern tractor, an important factor in determining its value for farm work, is uncertain as yet. The average use of the tractor is 45 days per year and replies to inquiries received show that 40 per cent of the tractors used required no expense for repairs in the first year. Those tractors between 2 and 3 years old averaged \$79 for repairs. The conditions under which tractors are operated, the rough and uneven ground and severe shocks to which they are subjected and their exposure to constant showers of dust and dirt are pointed out as causes for the excessive wear. This is being rapidly overcome, however, by the protection which the modern machines are given in construction.

Of 140 tractor owners in Illinois who had used their outfits one season or less, 48 reported that they spent nothing for repairs, the others had repair bills varying from a few cents to \$100 or more, the average being \$22, making the average repairs for the entire group about \$15. The figures obtained indicate that repairs are less among the 4-plow machines, but this may be due to the fact that the smaller outfits are more cheaply constructed. The report estimates an annual repair charge during the first 3 years of the tractor's life of about 3 per cent of the first costs.

Work Done by 2-, 3- and 4-Plow Outfits

Figures provided by the Illinois tractor owners for days of 10 net working hours show that the 2-plow outfit plows $6\frac{1}{2}$ acres per day, the 3-plow outfit $8\frac{3}{4}$ acres per day and the 4-plow outfit 10 acres per day. This, it is pointed out, does not coincide with the theoretical provision by which a 14-in. plow drawn by a tractor should cover 3 acres in a 10-hr. day, thus giving the figures of 6 acres per day for a 2-plow machine and 30 acres by a 10-plow outfit. The difference between the actual and theoretical figures is accounted for by the loss of time occupied by repairs and by possible unfavorable plowing conditions. A delay is frequently caused, it is pointed out, by a necessary repair on one plow which will naturally prevent the operation of the other 9 plows on a 10-plow outfit. Farmers are warned in the report against trying to make their outfits pull one more plow than they are rated to handle, as this tends to slow down the tractor and create mechanical difficulties according to the reports from those who are overloading their machines as compared with the farmers requiring their machines to pull only their normal loads.

The acreage covered per day at field operations other than plowing depends upon the relative draft varying with the width of the implement pulled. This makes it impossible to secure average figures which would be of value. In harrowing or disking for example the width of the implement pulled depends on the adjustment of the disks or harrow teeth and the depth of the ground worked. The nature of the soil also has an influence. The largest proportion of work done by tractors was found to be plowing and repairing the seed bed and in belt work. Hauling by tractor has been found less satisfactory and more expensive than by horses. Less than 20 per cent of the tractor owners reported doing hauling with their outfits.

The cost of operating, including fuel, oil and grease, re-

pairs, depreciation and cost of man labor, interest on investment, cost of housing, time spent caring for the outfit other than for repair work, etc., was found to be as shown in the following table:

Approximate Cost of Plowing an Acre with 2-, 3- and 4-Plow Tractors, Based on Average Cost of \$800, \$1,100 and \$1,400 Respectively, and a Life of 7½ Years of 45 Working Days Per Year

Size of Tractor	TOTAL*		FUEL		Oil	Grease	Repairs	Depreciation	Man Labor	Interest
	Gasoline Tractor	Kerosene Tractor	Gasoline	Kerosene						
2-plow...	\$1.58¼	\$1.33¼	\$.50	\$.25	\$.05¼	.02	\$.11	\$.36	\$.46	\$.08
3-plow...	1.47¼	1.22¼	.50	.25	.05¼	.02	.11	.37	.34	.08
4-plow...	1.50¼	1.25¼	.50	.25	.05¼	.02	.12	.42	.30	.09

*The cost of housing the outfit and other minor overhead charges, such as taxes, insurance, etc., are not included.

These costs are arrived at by allowing for a consumption of 2½ gal. of fuel per acre plowed, which is the average reported by the Illinois farmer. The replies indicated less difficulty from kerosene tractor owners than they encountered in 1916. Slightly more than 50 per cent of the Illinois tractors are operated on kerosene. The average price paid for gasoline in 1917 was 20 cents per gallon and for kerosene slightly less than 10 cents per gallon. In figuring the fuel costs extra allowance was made for warming up the kerosene engines with gasoline, estimating it at less than one gallon per day at a daily cost of 10 cents or one cent per acre plowed.

Lubricating Oil Quantities

The average quantity of lubricating oil was three-fifths of one quart per acre for all tractors reporting from Illinois. Some reported the use of nearly a gallon per acre while others used less than one pint per acre. With oil at 35 cents per gallon the average price paid, the cost per acre amounts to 5¼ cents.

Grease consumption averaged slightly less than one pound per day at a cost of 10 cents per pound, an average of 2 cents per acre. Based on these figures the average cost per acre for fuel, oil and grease is 57¼ cents where gasoline is used and 32¼ cents when kerosene is used.

The average annual repair charge was 45 cents per day plus an estimate of 4 per cent of the first cost which the Department allowed against the original cost of the machine, making a total average repair charge per day of 71 cents for the 2-plow tractor, 11 cents per acre, 98 cents for the 3-plow tractor, 11 cents per acre, and \$1.24 for the 4-plow tractor, 12 cents per acre.

Annual Depreciation

Assuming the average life of a tractor to be 7½ years the average annual depreciation, based on the average costs is:

Two-plow outfit	\$106.67
Three-plow outfit	146.67
Four-plow outfit	186.67

The daily charge based on 45 working days per year is:

Two-plow outfit	\$2.37
Three-plow outfit	3.26
Four-plow outfit	4.15

The depreciation cost per acre based on the average acreage is:

Two-plow	36 cents
Three-plow	37 cents
Four-plow	42 cents

The cause of the high depreciation costs for the 4-plow machine is due to its higher relative price.

The average cost of man labor, estimated at \$3 per day, gives the cost per acre for man labor of 46 cents for the 2-plow, 34 cents for the 3-plow, and 30 cents for the 4-plow outfit.

Figuring interest at a fixed annual charge of 6 per cent on the average investment which is one-half the first cost, for the different sized tractors and using the basis of 45 working days per year the average interest charge per day is: 53 cents for the 2-plow outfit, 73 cents for the 3-plow outfit, and 93 cents for the 4-plow outfit. The interest cost per acre based on the average acreage covered by the different sizes is, therefore, 7, 8 and 9 cents respectively. Because the 4-plow outfit daily acreage does not increase in proportion to its cost, its interest charge is higher than for the 2-plow or 3-plow tractor. The increased acreage plowed daily by the 3-plow machine as compared with the 2-plow offsets the increased charge due to higher prices.

In addition to including the above figures for estimating the costs there are also such items as fuel and oil used for stationary work, but the Department of Agriculture considers these relatively small and unimportant. It points out that all of the above cost figures can be used as a basis for arriving at relative costs for other operations with the tractor.

Tractors vs. Horses

The cost figures, it is said, are approximately the same as with horses excepting for the item of man labor, which is lower with the tractor than where horses are used. This emphasizes that the advantage of the tractor lies not so much in the reduction of the cost as in the fact that it permits one man to do considerably more work in a given period of time. It is also stated that horse and tractor costs cannot be compared, since on farms where tractors are used a number of horses are also retained and comparisons must be made between the cost of operating horses alone and the cost of operating the tractor and a certain number of horses. Frequently horses stand idle while the tractor is being used and in such cases the cost of their maintenance must be considered in the farm operations costs, as they are as much a part of the farm power plant as the tractor.

A number of farmers according to the report hesitate to purchase tractors fearing that they will not work as satisfactorily as horses, especially in plowing. Fifty per cent of the tractor owners reported that the plowing work is better by tractor than by horse while less than 3 per cent say it is poorer. The quality of the plowing depends more upon the plow and its adjustment than upon the tractor. The selection of a good gang plow is important. It is quite possible that an inferior tractor pulling a good gang plow well adjusted will do better work than a good tractor pulling a poor plow or one out of adjustment. The average depth of tractor plowing in Illinois is slightly less than 7 in. as compared with 5½ in. previously plowed by horses. Eighty-six per cent of the Illinois tractor owners reported their tractors satisfactory for use on plowed land. The general use of automobiles is educating the farmer in the operation of the gas tractor and eliminating many of the operating difficulties farmers experienced in the earlier days. The department points out, however, that some farmers are making a mistake in assuming that boys can operate tractors efficiently whereas only a proficient operator can handle the tractor properly. It urges farmers to take advantage of tractor instructions offered by some tractor manufacturers.

Tractor Reliability

The reliability of the tractor depends largely on the ability of the operator. Fifty-four per cent of 300 tractor owners reported their outfits not disabled a single day during the past year. Of the remaining 46 per cent the tractors were out of commission 5 days on an average not including one man who stated his machine was out of commission about half of the time. Ninety per cent of the tractors owned in Illinois were reported operated by some member of the farmer's family, the best results being obtained by this class of operators. Thirty-six per cent reported no time lost in the field because of trouble with the outfit. The average time lost per day by the 64 per cent reporting trouble was a little over three-quarters of an hour.

Farmers purchasing tractors to displace horses are likely to be disappointed, according to the replies from the Illinois tractor owners. The tractor does displace the horse to some

extent, but only in about three-fourths of the cases where it is used on the same number of acres as were previously farmed, in which instances the horses displaced averaged about four and represent about three-fifths the cost of the tractor outfit. There is considerable work on the farm which the tractor cannot perform and which must be done by horses.

About 45 per cent of the tractor owners used their tractors to some extent for custom work. Some purchased their tractors with custom work in mind, while others procured them for their own farms only and undertook custom work at the request of neighbors. The Department of Agriculture states that the use of a tractor at custom work seems a reliable indication that the home farm is not large enough to utilize the tractor economically. One-third of the tractor owners reported that custom work was unprofitable. In view of the fact that the average farmer ignores depreciation charges and many other proper expenses, it is likely that considerably

more custom work was performed at a loss. The 47 per cent of tractor owners reporting custom work in 1917 averaged 17 days in the year at this work.

Despite the greater depth of plowing with the tractor, crop yields do not seem to have increased materially. The greatest percentage of owners report no noticeable effect either in increase or decrease of the crop yield, which might be attributed to the tractor.

That the farm tractor has developed more rapidly in the past few years than any of the field equipment for use with it, excepting the gang plow, is a point developed in the report. It is urged that maximum results with a tractor can only be achieved when it is combined with implements designed for it. A minimum of results is obtained when implements designed for use with horses are used. As the implements improve in design and are constructed especially for tractors it is expected a higher percentage of profits will result from tractors.

Types of Small Electric Hoists and How They May Be Used

IN many places, and for many different kinds of work, the most economical means of lifting and hauling loads is provided by small electric hoists. Such hoists as those shown in the cuts herewith are capable of handling from one-half to five tons, and can lift at from five to ten times the speed of hand operated chain hoists. They have the further advantage of low cost, which is usually but a fraction of that of an electric travelling crane. Furthermore, they can be suspended at almost any point in the shop or can be used with shear pole, jib crane, a trolley running along an overhead track, or a small travelling crane. When used with a trolley or crane they can be moved about either by hand power or by means of a second electric motor.

One of the photographs reproduced herewith shows a large type electric hoist used in connection with an overhead track on which is fitted a travelling carriage driven by an electric motor. The other illustration shows one of the smaller type electric hoists, which in this case is attached to a trolley.

These hoists are controlled from the floor by means of pendant ropes. A brake, which is automatically applied when the controller is returned to the off position, holds the load suspended, and a safety switch automatically cuts off the current when the hook is hoisting to its safe limits of travel.

Special mechanical and electrical features are used in the construction of the motors to suit the service, which is equipped with the Westinghouse electric apparatus. The

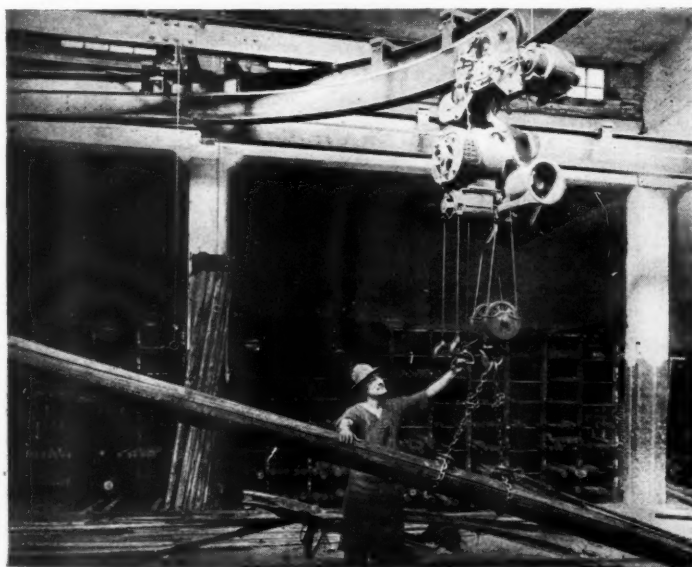
direct-current motors are modifications of the series-wound crane type. The alternating-current motors are of the poly-phase squirrel-cage type with high torque, rotor windings. Three-quarter horsepower motors are used for $\frac{1}{2}$ -ton hoists and 7-horsepower motors for 5-ton hoists, the ratings being figured on a 30-minute basis.

The controllers of the drum type are designed to break heavy currents without burning the contacts. When the tension on the control ropes is released, a spring returns the controller to the off position.

The hoists illustrated are built by the Yale & Towne Manufacturing Co. and are equipped with the Westinghouse electric apparatus.

New Spring Wheel Design

ISAAC HAYMAN of Los Angeles, Cal., has designed a driving wheel for motor vehicles in which there is a series of coiled springs between an inner and an outer hub intended to absorb shocks and jolts. Spring holders screwed into the outer hub from the inside are provided with extensions moving in radial slots in flanges on the inner hub, so there is a positive drive from the inner to the outer hub. To insure smooth action between the inner and the outer hub flanges a circular row of balls is inserted between the two flanges on each side of the hub.



Two types of small hoists operated by electric motors and controlled by pendant ropes. They are built by the Yale & Towne Mfg. Co. and equipped with Westinghouse electric apparatus



Getting Employees to a Distant Plant

Ford Company Uses Trucks and Trailers Between End of Street Car Lines at Eagle Boat Plant and Blast Furnaces More Than Two Miles Away—A Regular Schedule Maintained

AT almost any hour of the day, should you happen to be in the western outskirts of Detroit—out Michigan Avenue or Fort Street—you may see a crowd of workmen lined up along the curb of the street and wonder why they are there. Your curiosity will soon be partly satisfied by the arrival of a khaki-colored bus pulling a like-colored trailer of about the same size.

You will see the men step into the vehicles in orderly fashion and seat themselves on the long seats at each side. About a minute later you will see another conveyance arrive and take some more men away. You will see a procession of vehicles—one after another arrive and depart quickly with capacity loads of human freight. You might ask where all these men were going, and the answer would come: "To Henry Ford's big shipbuilding plant and blast furnaces at River Rouge."

Transportation Needed Quickly

Almost as soon as ground was broken for these mammoth plants, a means of transporting the workers to and from the site became a problem—but not one of difficult solution. The nearest car line was 2 miles distant; men could not be asked to walk so far back and forth every day. Such a walk, after a hard day's work, is not taken with relish nor with profit by the majority of men.

A transporting scheme had to be devised—and quickly. There was nothing else to do. So to be assured of workers, Henry Ford suggested the bus idea. But where were the trucks to come from? No such conveyances as could be used for this service were immediately available. But a manufacturer who has a record of building a car a minute and executing other tasks on a similar scale can be counted on to solve such a comparatively simple problem quickly.

Twenty-four hours after the plan was decided upon, three trucks with trailers were in operation carrying workers to the plants. All the material was at hand, it simply remained for someone to assemble it and build up the trucks. The regular Ford ambulance chassis was used and upon it was mounted a specially built body with leather upholstered seats at the sides.

The first vehicles were put in commission on March 1,

and to-day there are twenty-one in the service with three more to be added very shortly. The service was built up to 17 trucks within its first 2 weeks. As many as 7800 men are carried during the course of a day. Not all these men work for Ford directly, however. A number are engaged in construction work for outside interests, such as contractors and builders, as the erection of all the buildings is not yet completed. The men of five different companies are served by the bus line. Of the total, about 50 per cent are Ford employees.

On July 2, between the hours of 5.45 a. m. to 8.15 a. m., a total of 3720 men were carried—1545 from Fort Street and 2175 from Addison switch. From the Fort Street car line it is a distance of 2 miles and takes 6 minutes to make the trip. Addison switch is 2½ miles from the plant, but this route takes almost twice as long because of the bad brick road traveled part of the distance, and because of frequent delays at railroad crossings of which there are eight. Thirty-four hundred and forty passengers were carried during the same morning period on July 1 and 3655 on July 5, when 70 trips were made. The biggest rush is manifested between 6.10 a. m. and 7.30



Busses waiting at the Ford shipbuilding yards

[illegible]

Each driver keeps a record of the number of trips he has made and details of the trip. A card for this purpose, as well as a repair card, is given him

pair card, is given

FORM FORM 1949

MOTOR TRUCK REPAIR

Date _____

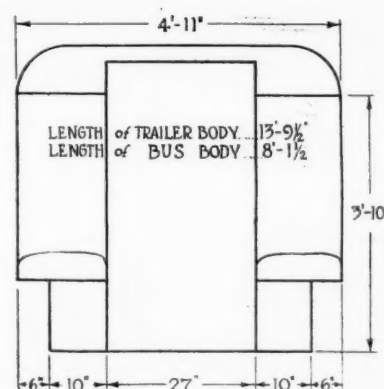
Driver No. _____ Shift _____

Vehicle and No. _____

Repairs _____

NAME

HO



*Diagram of the dimensions of
the bus and trailer*

a. m., at which time capacity loads are always carried.

After this morning shift men start coming in again for the afternoon shift at 1.30 p. m. Bus service is maintained from this time uninterruptedly until 11.30 p. m. The afternoon shift starts at 3.30 p. m., and by the time all the men have arrived those who are quitting are ready to use the busses to take them back again to one of the car lines or termini of the bus line. This departing service which starts at 3.15 p. m. and ends at 11.30 p. m. overlaps the previously mentioned schedule, namely: 1.30 p. m. to 6.30 p. m. All these schedules utilize the entire number of busses.

For the night schedule which starts at 11.30 p. m. and ends at 8.15 a. m. only seven cars are operated. This also overlaps another schedule—the first one which begins at 5.45 a. m. The commencing of this latter schedule brings into service the other fourteen cars, making the total twenty-one again. To put it in other words, the service is almost unceasing. There is a lapse of only 5 hours and 15 minutes—from 8.15 a. m. to 1.30 p. m.—when the busses are not needed on the road because there are no changes in shifts at this period. During this period, however, the trucks are not idle, but are utilized in conveying materials from one part of the plant to another.

There are 3600 Ford employees benefited by the bus service. Within 30 days it is estimated that 10,000 names will be on Ford's payrolls of these two plants and more vehicles will be pressed into service.

It takes 110 men, including the repair men and garage

clerks, to operate the bus line. Each bus has two men—a driver and conductor who work in 8-hour shifts. While on the road the conductor travels on the rear step of the trailer and when a railroad crossing is approached the bus is brought to a dead stop. Here it is his duty to jump off and cross the tracks and signal the driver if it is safe for the vehicles to proceed.

A report of all passengers carried is made out by the conductor each shift. At both termini of the bus line are men—usually the foremen of the shifts—who check all cars as they leave. The reports that they make out include the bus number, the total number of passengers of each and the time the vehicle leaves. This report proves valuable evidence when frequently workmen arrive late for work and attribute their tardiness to a delay of a bus. A glance at the report will instantly reveal whether or not the bus service is to blame.

At the garage is a bus register which gives the badge number of the driver, his name, his destination, the bus number, time he left and the time he came in. This serves to show at all times just who is driving each car and on what route he has been assigned.

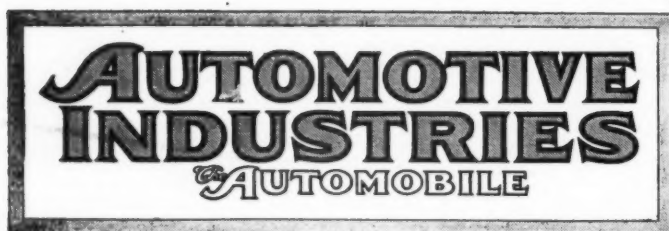
The cost of operating these vehicles has not yet been definitely determined, but estimating the cost on a basis of a capacity load it equals 2 cents to 3 cents a mile per man for gas, oil and repairs. This is not taking into consideration the cost of labor. When the service was first established the cost was estimated at 4 cents, but when it became systematized it was brought down about 50 per cent.



One bus departing from the plant while the second one is awaiting a load



Busses loading at starting point. If the picture had been snapped a half hour later two or more busses would have been included in the scene, all loading men at the same time



PUBLISHED WEEKLY
Copyright 1918 by the Class Journal Co.

VOL. XXXIX Thursday, August 1, 1918 No. 5

THE CLASS JOURNAL COMPANY

Horace M. Swetland, President
W. I. Ralph, Vice-President E. M. Corey, Treasurer
A. B. Swetland, General Manager
U. P. C. Building, 231-241 West 39th Street, New York City

BUSINESS DEPARTMENT
Harry Tipper, Manager

EDITORIAL

David Beecroft, Directing Editor
A. Ludlow Clayden P. M. Heldt
Sydney Oxberry
DETROIT OFFICE WASHINGTON OFFICE
J. Edward Schipper Allen Sinsheimer

BRANCH OFFICES

Chicago—Mallers Bldg., 59 East Madison St., Phone Randolph 6960
Detroit—95 Fort Street, West, Phone Main 1351
Cleveland—Guardian Bldg., Phone Main 1142.

Cable Address Autoland, New York
Long Distance Telephone 8760 Bryant, New York

SUBSCRIPTION RATES

United States and Mexico	One Year, \$3.00
Canada	One Year, 5.00
Foreign Countries	One Year, 6.00

To Subscribers—Do not send money by ordinary mail. Remit by Draft, Post-Office or Express Money Order or Register your letter.

HORSELESS AGE SUBSCRIBERS

Subscriptions for the Horseless Age transferred to the subscription list of AUTOMOTIVE INDUSTRIES in the merging of the two publications will be completed in full by the weekly issues of AUTOMOTIVE INDUSTRIES to the dates of expiration shown on the records of the Horseless Age Co.

Owned by United Publishers Corporation, Address 243 West 39th St., New York; H. M. Swetland, President; Charles G. Phillips, Vice-President; W. H. Taylor, Treasurer; A. C. Pearson, Secretary.

Entered as second-class matter Jan. 2, 1903, at the post-office at New York, New York, under the Act of March 3, 1879.

Member of the Audit Bureau of Circulations.

Automotive Industries-The Automobile is a consolidation of The Automobile (monthly) and the Motor Review (weekly), May, 1902, Dealer and Repairman (monthly), October, 1903, and the Automobile Magazine (monthly), July, 1907.

The Proposed Transatlantic Flight

ONE of the most daring proposals to which the war has given rise is that to fly aeroplanes built in the United States across the Atlantic Ocean to the battlefields of France. Large numbers of planes of all kinds are wanted on the battlefield, and are wanted quickly, too. The production of planes and of engines for them is rapidly rising, and if one asks the engineers connected with aircraft production as to the possibilities in the way of output during the next several months, the usual answer is that they can make all that can be transported across to France. Hence, the shipping situation has become the limiting factor in the aircraft program, and though ship construction is being pushed with the utmost vigor, there is little chance of this situation being materially changed for months to come. That is, our capacity for producing planes will continue to run ahead of our ability to transport them across the ocean.

If the planes could be flown across this would solve a most perplexing problem. Of course, only planes of the type of large long-distance bombers could be expected to make the flight successfully, for it would be necessary to carry not only a fuel supply sufficient for some 2000 miles flight, but reserve pilots as well. The plan of plane drive-aways, we believe, originated in England, in connection with a large bomber type plane of British design which is to be manufactured in this country.

It is easy to foresee numerous difficulties and dangers besetting an undertaking of this sort, and it is almost a certainty that a fraction of the departing machines would be lost on the way. This, of course, does not disprove the practicability of the scheme, as some machines would be lost even if they were sent abroad on board ship. The proportion which can be gotten to their destination safely is the all-important factor, and this can be determined only by actual trial. If it is decided that the chances of success are sufficient to warrant a trial, we may be sure that the greatest precautions will be taken to prevent loss at sea, by distributing station ships along the proposed route of travel, and in various other ways.

If planes of well tested construction are selected, the most experienced and capable drivers picked and station or signal ships are placed at reasonable distances apart all along the line of flight, the scheme would seem to have a reasonable chance of success. Non-stop flights of nearly the distance required to be traversed in this case were made several years ago with much smaller machines than are now available. Undying fame awaits the pilot who first succeeds in completing the aerial journey from the New World to the Old, and volunteers will not be wanting to guide the machines across the big expanse of water.

In this connection it may be said that the offer of large cash prizes, which under ordinary conditions might have been a strong incentive, will have little effect on the materialization of the scheme. If it can be carried out successfully, its consequences from a military standpoint are so enormous that the prizes offered pale into insignificance in comparison.

Value of the Notch Bar Test Questioned

IN Europe the notched bar test or impact test has come into extensive use of late years for detecting brittleness in steels, but some engineers of high standing are far from being convinced of its practical value. This test consists essentially in letting a heavy hammer arranged as a pendulum drop from a certain height, break a notched test bar of specified dimensions when in its lowest position and noting the height to which the pendulum rises after having broken the test piece. The difference in height at the beginning and end of the swing multiplied by the weight of the hammer gives the energy in foot-pounds absorbed in breaking the test piece. The theory is that the tougher the steel the more energy will be required to break the specimen and

that a steel which absorbs little energy in the impact test must necessarily be brittle.

The test has been applied mainly as a check on heat treatment, and it appears that there has been a great deal of difference of opinion as to its suitability for the purpose. One argument made against the test is that it subjects the steel to strains unlike any to which it is subjected in regular work. This does not apply to the tensile, transverse and similar tests. The notch in the test bar concentrates the strains at one point, and a similarity of conditions might be claimed for more or less sharp shoulders on shafts, etc., but these in practice are never subjected to such extreme shocks that a single shock suffices to cause the part to fail. A test which subjects the material to exactly the same sort of strains as those it has to bear in regular work certainly meets with the greatest amount of confidence on the part of engineers and properly so.

One thing that has served to shake faith in the

impact test is its absolute lack of correlation to the micrographic test. This was brought out in the discussion of a paper on Round Test Specimens for the Impact Test, read before the Institution of Automobile Engineers some time ago. One of the speakers mentioned that a piece of nickel chrome steel, oil-hardened at 1830 deg. Fahr., reheated to 1150 deg. Fahr., and quenched in water would show a most objectionable looking structure, yet would test about 50 ft.-lb. on the Izod impact machine, whereas the same steel oil-hardened at 1475 deg. Fahr., reheated to 1150 deg. Fahr. and cooled slowly, though showing a beautifully fine grain structure, will only show about 15 ft.-lb. on the impact machine. From the micrographs most every engineer would pick the last-mentioned specimen as the better one.

It would thus appear that the long established practice of determining the elastic limit, breaking strength, contraction of area and extension is more reliable than the use of the impact machine.

The Case of the Truck and the Case of the Passenger Car

EVERYONE connected in any manner with the industry can, and probably does, find much justifiable satisfaction in the way the case of the motor truck was presented before the Priorities Committee of the War Industries Board. It was a good job, well done.

When those of us who are in the industry read the statement which the representatives of the truck manufacturers presented to the committee, we are filled with a feeling of gratification at the thought that we are devoting our energies to something so well worth while. Not only that, but we are pleased that the facts substantiating the essential character of the motor truck have been so clearly presented that they cannot possibly escape comprehension, with the resulting benefit that the country, at this time when it needs so badly just what the motor truck can give, will not be denied its help, as it might have been, through a failure to realize how great that help can really be.

It was a simple, direct, dignified, convincing statement. In the most sincere manner it indicated a

desire on the part of the makers to co-operate with the Government. It expressed an honest conviction which it backed up with logical evidence "that trucks used in this country are necessary to a swift winning of the war," and asked for the committee's careful consideration of the request for steel and fuel priorities "on this basis alone."

The case of the motor truck is clean cut. It seems to many of us to be almost obvious. The utilitarian value of the truck is very close to 100 per cent. A few incontrovertible and almost self-evident facts logically presented form a conclusive argument establishing its practical worth. In the case of the passenger car, on the other hand, the facts may not be so apparent. They are, nevertheless, just as real and just as capable of being demonstrated even if some different method must be employed. In its case volume of testimony must be relied upon. And there are large volumes of it to be had. Some day, perhaps, it may be compiled and the real case of the passenger car presented. For the good of the country as a whole that day cannot come too soon.

Recognition from Abroad

WHATEVER efforts have been made to belittle the engineering achievement represented by the Liberty aircraft engine have by this time been pretty well nullified, but it is interesting, nevertheless, to observe that the head of the British Air Service, Sir William Weir, speaks of the engine in most appreciative terms. It was on the occasion of the Sixth Wilbur Wright lecture, recently delivered to the Aeronautical Society by an American scientist, Dr. W. F. Durand, at which Sir William Weir presided. At the conclusion of the lecture, referring to the aircraft situation in general and the materials question in particular, Sir William stated that thorough and searching tests recently applied in France and England to the Liberty engine had justified the prediction that it would prove a most

valuable contribution to the Allied resources, and that the United States could go ahead and push these productions with every confidence. The results so far obtained placed the engine in the very first line of high powered aeromotors.

This testimonial to the qualities of the Liberty engine is the more acceptable for the reason that much of the criticism which has been passed upon it originated with interests connected with foreign-designed engines. It is no longer necessary to accept the word of those responsible for the Liberty engine that it has made good in every respect; we now have the word of the highest authority on aircraft matters in England, supported by thorough and searching tests, that the Liberty engine ranks in the very first line among engines of its class.

□ Latest News of the

Tax Cars and Trucks On Cost

Federal License in Addition to
Impost on New Vehicles—
2 Cents per Gallon on Gas

WASHINGTON, Aug. 1—A heavy excise tax, a tax of 10 per cent on new cars and 5 per cent on new trucks, and a tax on gasoline were written into the new Revenue Bill by the Ways and Means Committee yesterday. The excise tax includes cars, trucks and motorcycles and will be in the form of a Federal license tax, and in the case of cars and trucks is graduated according to the original cost of the machine. The tax on motorcycles is \$5 regardless of the original cost.

The graduated tax which will yield about \$125,000,000 annually, will operate under the following schedule:

Not over \$500, annual license.....	\$10
Above \$500, not over \$750.....	15
Above \$750, not over \$1,000.....	20
Above \$1,000, not over \$1,500.....	50
Above \$1,500, not over \$2,000.....	40
Above \$2,000, not over \$2,500.....	50
Above \$2,500, not over \$3,000.....	60
Above \$3,000, not over \$3,500.....	80
Above \$3,500, not over \$4,000.....	100
Above \$4,000, not over \$4,500.....	120
Above \$4,500, not over \$5,000.....	140
An additional \$40 for each \$1,000 of original cost above \$5,000.	

The tax on gasoline of 2 cents per gal. is expected to raise \$45,000,000. The Committee believes a gasoline tax will lead to a considerable conservation of gasoline reducing its needless use in passenger cars. This is the sole purpose of placing this gasoline tax.

A tax on used cars through a tax on dealers is also contemplated by the Ways and Means Committee. Chairman Kitchen thinks that some method of taxing used cars will be found as they would escape taxation under the methods already agreed upon.

The graduated tax on cars and trucks undoubtedly will encounter a struggle in the Senate where the Finance Committee has stated where it will never agree to a tax of this sort which is unfair because of the reduction in prices of cars affected during the last few years by better production methods and lower cost of materials. They state that the plan is unfair to the motorist who owns a car several years old to have to pay a higher tax than the motorist who owns a car two or three years old. This should be reversed, states the Finance Committee.

The graduated tax on trucks is tentative. There will probably be a lower graduated scale arranged, to apply to trucks only, as the committee has displayed some understanding of the utility

of the motor truck, having applied but 50 per cent of the car tax through the manufacturer to the motor truck.

The tax on gasoline is to be paid by the manufacturer or producer but it is expected that it will be passed on to the consumer by them.

DETROIT, MICH., Aug. 1—Manufacturers expect that a general increase in the price of cars and trucks will follow the passage of the proposed taxation measure, but they hold out hope that the \$70,000,000 which the tax is expected to raise is an indication that the government will permit them to get sufficient steel to enable a production somewhat better than had been hoped for. It is freely predicted that the burden will fall upon the purchaser and fear is felt that this will have a marked effect on sales.

Define War Work

WASHINGTON, Aug. 1—The Department of Labor defines war work as follows:

1—The manufacturer of products or erection of structures directly or indirectly supplied to some department of the government for use in connection with the war. Indirectly supplied includes goods delivered under sub-contract to government contractors.

2—Coal mining is wholly war work.

3—Railroads and farms are engaged in war work and will be protected from all recruiting by other industries.

Daniels Opposes Air Ministry

WASHINGTON, Aug. 1—Any effort by Congress to create an air ministry to control the production of aircraft will be opposed by Secretary of the Navy Josephus Daniels. He said yesterday there would be no more single reason for establishing control over aircraft by means of a ministry than there would be for establishing a ministry control of submarines in the War Department.

Winningham Named Oil Chief

WASHINGTON, Aug. 1—C. C. Winningham one of the principal stockholders of the Hudson Motor Car Co., who has had charge of the Hudson product for the last 8 years and of its advertising has been appointed chief of the Gasoline Section and Director of Publicity of the Oil Division of the Fuel Administration under W. C. Robinson, who is director of the Bureau of Oil Conservation. The work of Mr. Winningham will include the elimination of gasoline waste by distributors and users, the conservation of lubricating oils, and the inauguration of methods for reclamation of oil that has been used.

40,000 See Tractor Demonstration

112 Machines Started at Once—
Need for Better Engineer-
ing Is Voiced

*SALINA, KAN., July 31—The annual National Tractor Demonstrations being held here are proving to be the greatest demonstrations by far that have ever been held.

To-day over 40,000 witnessed 112 different tractors working in one huge field a mile in width and nearly half a mile long. Promptly at 1.30 all of the 112 started across the field, some pulling ten plows and others pulling different numbers, down to the smallest sizes that pull but two.

No sooner had these 112 started turning over the fertile winter wheat acres of the State than 27 other tractors, drawing every other conceivable form of farm machinery came on the plowed soil and demonstrated the all-conquering aspect of the tire. The mile of tractors waiting for the starting signal called to mind a veritable tank attack, the industrial tanks of the army at home that are doing their part to produce the food and other necessities for our army on the other side of the ocean.

The spirit of co-operation among all of the tractor makers has never been so generally apparent as this year. There is on every hand nothing but the best of team work. This spirit was well displayed at the dinner of the Society of Automotive Engineers to-night when F. P. Mount of the Advance-Rumely declared that the bringing out of better tractors is the best thing for the industry no matter whether those tractors come from old line concerns or from newer firms in the automobile or allied industries. Better tractors are needed and due recognition must be given them no matter where they come from.

J. A. Everson of the International Harvester Co. told of the great educational work his concern is doing in educating farmers to the more intelligent use of tractors. His company has conducted upward of 600 different schools of instruction, and in these farmers using different makes of tractors attend; in fact, 30 per cent of the farmers own tractors of other makes.

J. B. Davidson of the University of California, who has been conducting the drawbar and belt tests at the demonstrations, declared that more engineering is needed in several tractors, and that the engineer must take a stronger place in

(Continued on page 210D)

Automotive Industries



To Cut Tire and Tube Production 50% During August and September

War Industries Board "Requests" Restriction and Would Curtail
Use of Cars—Allocation Rate Little Changed—
Rubber Section of War Board

NEW YORK, Aug. 1.—The War Industries Board has requested the rubber industry to cut down the production of pneumatic tires and tubes during the months of August and September to 50 per cent of its production during the same months of 1917, and has placed itself on record as expecting that the use of tires will be restricted to war and essential business purposes. It has further let it be known that steps are now being taken to restrict the use of tires to such purposes, but no inkling of the steps to be taken has been permitted to become public.

The request to cut tire production during this two-month period really amounts to an order, and follows a recommendation made to the War Industries Board by the War Service Committee of the Rubber Association of America, that such a step be taken. The War Service Committee also suggested that the use of tires be restricted to essential war and business purposes and as a means to this end has proposed a Federal licensing system for cars and trucks so that every one may be checked up and the essential or non-essential character of its purposes definitely known.

600 Representatives Present

More than 600 representatives of the rubber industry gathered at the Waldorf here today to go over with the War Service Committee of the Rubber Industry its recommendations for the importation, allocation and use of rubber, following the closing of the first quarter of the year during which Government restrictions on imports were to be effective.

Last April, the Government ruled that during the three-month period commencing May 6 and ending July 31, only 25,000 tons of rubber might be imported, and that during the year, May to May, the total importation might be only 100,000 tons. The expiration of the period was the occasion for the gathering.

In consequence of recommendations made by the War Service Committee, the next period is to be of only two months' duration, the understanding being that in that period the rubber industry is to furnish the Government with additional data upon which to decide what quantities may be imported during the remainder of the year.

The War Trade Board has ruled that

during the months of August and September, rubber may be imported at the same rate as for the initial quarter of the year, i. e., at the rate of 100,000 tons a year. The rate of allocation by the Rubber Association of America, however, has been slightly altered. During these two months, consumers will have rubber allocated on the following basis:

(a) Government requirements are to be supplied in full;

(b) The remainder to be allocated to consumers at the rate of three-eighths of their consumption during the same period last year. (In the first quarter the rate was one-quarter of seven-sixteenths.)

(c) New consumers will have rubber allocated in proportion to their mill or churn capacity.

No Hardship Anticipated

Although the production of tires and tubes is to be cut down 50 per cent during August and September, it is not anticipated that this will cause any great hardship on dealers. The restriction applies only to manufacture, and inasmuch as many tire companies carry fairly extensive stocks on hand, it will be possible for them to supply current demand from these stocks.

The burden apparently will fall most heavily on small manufacturers, and particularly on those who have either started since August, 1917, or who had very small production at that time. At the request of a majority of those present, the War Trade Board is to be asked for a ruling which would permit all manufacturers to base production during August and September on 50 per cent of their average production during the first 6 months of 1918, though small hope is held out that such a ruling will be obtained.

Textile and Rubber Division

So that there may be closer co-operation between the War Industries Board and the rubber industry, a new section of the War Industries Board has been created. This will be known as the Textile and Rubber Division and is headed by John W. Scott, who will have supervision over textile matters. Henry T. Dunn, president of the Fisk Rubber Co., Chicopee Falls, is head of the rubber section.

In presenting its case before the War Industries Board, the War Service Com-

mittee reviewed at length the various uses to which rubber is put. It pointed out that the entire importation of rubber during 1917 only occupied 3.6 per cent of the total shipping tonnage entering Pacific ports, though it represented 28 per cent in the value of all imports. Now, due to improved packing methods, the same quantity of rubber can be carried in 2.7 per cent of the shipping tonnage.

The committee completed its presentation with an urgent plea for more rubber, stating that unless more is permitted to come in the Government will find itself seriously handicapped for lack of it. Following is practically the complete report of the committee:

The War Trade Board, pending the further ascertainment of facts, limited the amount of crude rubber which might be imported, and has, for the months of May, June and July, 1918, specified the amount of such importation to which each manufacturer is entitled as evidenced by allocation certificates issued by the War Trade Board, each manufacturer being permitted to receive for three months (exclusive of rubber for Government contracts) one-quarter of seven-sixteenths of the amount of crude rubber which it received throughout the year 1917. In this the War Service Committee fully acquiesced as an emergency measure. But operation under these restrictions for approximately three months has shown conclusively that, if the same restrictions are continued for any prolonged period, a serious situation will arise which will handicap the Government in securing some of its most important supplies to meet the urgent war demands. The situation is such that there must be either an extremely radical reduction in production or an increase in importation of crude rubber—or both.

The greater part of the crude rubber imported comes from the British and Dutch possessions in the Far East, and most of this arrives at Pacific ports. The amount so imported in 1917 occupied 3.6 per cent of the total shipping tonnage and constituted, in value, 28 per cent of the importations to the Pacific Coast ports. Under a new method of packing, this quantity of rubber will occupy only 2.7 per cent of the shipping tonnage. The details of this are set forth in Exhibit B in the Pamphlet of Exhibits accompanying this memorandum.

The amount of rubber used in 1917 in the production of various classes of goods, as compiled from 448 replies to 503 questionnaires sent to the trade, is set forth in Exhibit C. From this it appears that the crude rubber consumption in 1917 was nearly 160,000 tons, whereas the Government is working on the basis of allowing only 100,000 tons per annum.

Coincident with this decrease in the permitted supply of crude rubber, the demands for manufactured articles has increased; for instance, the increase in the demand for truck tires, which are essential to war activity and transportation, is fourfold, and the increased demands for such essential articles as footwear, surgical materials, etc., are also very substantial. In 1917 the tonnage

(Continued on page 210a)

Economy Records Attained by Airplane Mail Service

WASHINGTON, July 27—Reports of the comparative cost of operation and maintenance of the air mail service shows records attained for economy for gasoline consumption. The total operating expenses of 9 airplanes aggregating 7234 miles of flight was \$2,682. Total gas consumption for 113 hours and 8 minutes of flying was 1377 gallons, which is \$32.50 per hour, approximately 50 cents a mile.

The average consumption of gasoline for the 9 planes was 12 gallons per hour.

A Curtiss JN 4 machine flying 26 hours and 40 minutes at a cost of \$28.01 per hour covered 1719 miles at a cost of 43½ cents per mile. A Hispano-Suiza 150 hp. engine equipped plane used 8 gallons of gas per hour. A plane equipped with a 400 hp. Liberty engine used 17 gallons of gas per hour. This figure is about 40 per cent less than is generally required for airplane engines of these sizes.

The total operating cost mentioned above includes departmental overhead charges, interest on investment, parts replacement, mechanic's time, gasoline and lubricating oils, motorcycles and trucks, rent, fuel, light, telephone, pilots' salaries and salaries of hangar attendants.

Detroit Aircraft Bureau Moves

DETROIT, July 29—The Bureau of Aircraft Production has been moved from 870 Woodward Avenue to the fourth floor of the Ford Motor Co. branch, and the entire working force of more than 200 people is now at work in the new quarters.

Rapid Growth of Aeronautics Department

WASHINGTON, July 29—The Department of Military Aeronautics, recently organized, has grown to include more than 1000 civilian employees in addition to the officers and enlisted men. Thirty stenographers and 50 typists are needed by this department, particularly those who are qualified to take dictation and

make transcription in both French and English. Applicants should call upon or address the Civilian Personnel Office, Department of Military Aeronautics, Building B, Sixth and B Streets, N.W., Washington, D. C.

624 Men Called for Aircraft Board

WASHINGTON, July 24—Provost Marshal General Crowder to-day issued a call for 624 limited service men for duty with the Aircraft Production Board. The majority of them will report for work at various mechanical trades at Kelly Field, San Antonio, Texas. Twenty-four of the men will perform clerical work here in Washington.

Aircraft Investigation in the East

WASHINGTON, July 24—Attorney-General Gregory, Charles E. Hughes and W. L. Frierson will make their headquarters in New Jersey for the time being to resume hearings in the aircraft investigation they are making.

Three Deaths at Aviation Field

WASHINGTON, July 27—Three deaths occurred at aviation fields in the week ending July 20, representing one fatality for every 7926 hours flown or 634,080 miles of air travel. Following is the summary:

Brooks Field, San Antonio, Texas.....	1
Kelly Field, San Antonio, Texas.....	2
Total	3

Bosch-Owned Bicycle Plant Taken

READING, PA., July 28—The Reading Standard Motorcycle and Bicycle Co., which operates a plant employing 300 workmen, has been taken over by the Government on the direction of A. Mitchell Palmer, alien enemy property custodian. The Bosch Magneto Co., of New York, already taken over by the Government, is said to be the owner of the controlling interest in the Reading Standard Company. A. T. Murray and A. E. McGavin, Government agents, have been made president and general manager, and the company is now filling Federal orders.

Philadelphia Aircraft Plant Completes 50 Flying Boats

WASHINGTON, July 27—The first order for 50 naval flying boats placed with the new navy aircraft factory at Philadelphia has been filled and the greater part of the machines are now flying over British waters. This was revealed to-day in a statement by Secretary of the Navy Daniels. The first flying boat had a successful trial flight on March 27.

The forms for the first boats were laid October 12, 1917, despite the fact that the factory building itself was not completed until November 28. These feats prompted Secretary Daniels's letter containing these statements and felicitating Naval Constructor F. G. Curn, who is in charge of the naval aircraft factory.

The contract for the aircraft factory was awarded August 6, 1917, and work began the same day. The original factory had 160,000 sq. ft. of floor space. An extension adding 55,400 sq. ft. was begun February 26, 1918, and is now completed.

Chevrolet Price Increased

FLINT, July 29—The Chevrolet Motor Co. will increase the prices of its models on Aug. 1 as follows:

Model	Old Price	New Price	Increase
Baby Grand.....	\$995	\$1,095	\$100
4-90	685	735	50

No Gasoline Restrictive Measures

WASHINGTON, July 27—Due to considerable uncertainty among users of gasoline, the Oil Division of the United States Fuel Administration announced that there are no restrictive measures in force. A campaign will be launched shortly to eliminate the great waste of gasoline and lubricating oils which occurs in garages, repair shops, service stations, etc. The campaign will be headed by the slogan "Stop the leaks and save the drops."

Loco-Tractor Invented by Ford

DEARBORN, MICH., July 29—A tractor locomotive has been invented by Henry Ford and is now being experimented with at the tractor plant at Dearborn. It is a regular tractor fitted with flange wheels which are connected with a driving rod, and is capable of developing enough power to draw eleven loaded trucks. The device is only in an experimental stage but is very likely to be produced on a large scale.

The Loco-Tractor, as it is styled at the plant, could be used at a great saving in large manufacturing plants, rice fields and copper and coal mines where it could do the work of scores of horses and mules. In tropical countries it is believed the Loco-Tractor could be used to draw passenger trains. Ford is experimenting with it at his tractor plant in drawing sand to fill in a small lake which borders the property.



Ford's Loco-Tractor is capable of developing enough power to draw eleven loaded trucks

De Palma Victor at Chicago

Breaks Two World's Records
in Races—Wins 20-Mile at
Rate of 110 M.P.H.

TWO-MILE

Driver and Car	Time	M.P.H.
Resta	1:18.0	92.3
Chevrolet, Frontenac.....	1:18.4	91.7
De Palma, Packard.....	1:19.0	91.1
Mulford	1:20.0	90.0
Vail	1:42.0	74.2

TEN MILE

Driver and Car	Time	M.P.H.
De Palma, Packard.....	5:24.8	110.8
Chevrolet, Frontenac.....	5:25.0	110.7
Resta	5:26.0	110.4
Mulford	5:26.2	110.3

TWENTY MILE

Driver and Car	Time	M.P.H.
De Palma, Packard.....	10:50.2	110.7
Resta	10:51.6	110.4
Mulford	10:52.0	110.04
Chevrolet, Frontenac.....	10:52.2	110.03

THIRTY-MILE

Driver and Car	Time	M.P.H.
De Palma, Packard.....	16:54.8	106.42
Chevrolet, Frontenac.....	16:55.8	106.30

CHICAGO SPEEDWAY, July 28—Ralph De Palma in a series of spectacular races here to-day took first place, incidentally breaking two world's records. All the races were hotly contested, with the lead usually alternating between De Palma and Chevrolet, who drove the Frontenac with its usual steady gait.

Resta got his car going well in the first race and took the 2-mile event in 1:18, or at 92 m.p.h., the slow time being accounted for by the standing start. Duray broke the rear axle shaft of his Frontenac a few seconds after the field got under way, scarcely having moved 100 ft. from the starting line.

The 50-mile race was abandoned after three laps had been run on account of rain.

When the smoke of battle had finally cleared De Palma had 22 points safely tucked away, Chevrolet 18, Resta 15, Mulford 10 and Vail 2.

All the races except the 2-mile were from flying starts. In the first race Resta was followed closely by Chevrolet, De Palma, Mulford and Vail in the rear and suffering from ignition trouble.

In the 10-mile race Vail had the pole, and after the field had got under way Resta came trailing around with plug trouble before he had crossed the tape and the field was again started.

It was a duel between Chevrolet and De Palma, the latter winning at the speed of 111 m.p.h. in the 20-mile. The four cars, Vail having retired with ignition trouble, were bunched most of the time, with the lead held principally by De Palma. Chevrolet, Resta and Mulford were serious contenders, but on the last lap the big Packard was shot over the tape with another record to its credit.

Under a threatening sky the four cars lined up for the 30-mile race, with Resta

at the pole. De Palma set such a terrific pace that Resta was forced to his pit, where diagnosis of his trouble indicated a burned out connecting rod bearing.

This left De Palma and Chevrolet sole contenders. So closely were they matched that when Starter Wagner finally waved the checkered flag De Palma crossed the tape but one second ahead of Chevrolet. Earlier in the race Mulford came to the pit with a plugged oil line.

Just before the race started De Palma's car got afire at the pits, but quick work put it out. There was no more damage than a scorched plug. Resta's car was considerably improved over its appearance in the Derby last June. Fouled plugs were his chief offenders. Mulford drove his first Sunday race, and although he kept well bunched with the leaders, his Frontenac did not possess quite enough speed to capture any of the events.

Vail showed up for the 50-mile race after having done considerable adjusting, and ran well with the field up to the time the race was flagged.

Officials of the speedway estimated from 15,000 to 18,000 people scattered about the paddock, grandstand and bleachers, and what the crowd lacked in numbers it made up in enthusiasm, for the spirited close time kept everyone on the alert. The previous 10-mile record on the Chicago track was held by Resta, and was 8 sec. more than De Palma's time made to-day. In setting the record for 20 miles, De Palma beat his own time, 10:53.08, made at Sheepshead Bay last August.

Bearing Company Insures Employees

BOUND BROOK, N. J., July 30—The Bound Brook Oil-less Bearing Co. has insured all employees who have been in the service of the company for 3 months for \$500. This amount increases with the length of service. The expense of the policies is paid by the company, and the insurance plan applies to employees at the Bound Brook plant and the two factories at Lincoln, N. J.

C. A. Lawton Building Addition

DE PERE, WIS., July 29—The C. A. Lawton Co., manufacturer of gasoline engines, is completing work on a 2-story addition, 40 x 120 ft., to be used for the forge shop, pattern-making department and machine shop. A new boiler room, 36 x 40 ft., is also being erected. The structures will be ready shortly after Aug. 1.

Standard Foundry Changes Hands

RACINE, WIS., July 29—The Standard Foundry Co. has been purchased by a syndicate headed by Arthur Janes, from Henry and Albert Kousek, who established the plant in 1907. The foundry has been idle for several weeks because of a labor dispute, but will be reopened at once in order to fill Government contracts. The new officers of the company are: President, Arthur R. Janes; vice-president, David G. Janes, secretary and treasurer, E. L. Mrkvicka.

G.M.C. to Take Over United Motors

Negotiations Reach Stage of
Definite Plan for Exchange
of Stock

NEW YORK, July 30—Negotiations having as their object the taking over of the United Motors Corp. by the General Motors Corp., the first inkling of which was given in the issue of AUTOMOTIVE INDUSTRIES for Feb. 28, have now reached the stage where a definite plan for the exchange of stock has been laid down, and it appears likely that the deal will be completed within a few days.

It is proposed now that General Motors acquire United Motors through the exchange of three-tenths of a share of General Motors preferred and one-tenth of a share of General Motors common for each share of United Motors. At the present time General Motors common is selling around 145, with the preferred at 82. On this basis, it would mean that United Motors stockholders would receive \$39 worth of General Motors stock for each share of United, which at present prices is worth about \$32.

Although no definite action has been taken as yet toward the ratification of this plan, it is regarded as likely that it will go through substantially as outlined. The United Motors Corp. has let it be known that it looks favorably upon the amalgamation, and it is known that General Motors has for several months been planning such a course of action.

The acquisition of United Motors by Durant interests appears entirely logical, inasmuch as it would give General Motors control of a big parts-making company. Chevrolet already owns 106,000 shares of United stock, and this will assist in the consolidation.

The United Motors Corp. was formed in May, 1916, and was an amalgamation of the following companies engaged in the manufacture of accessories, which are controlled by stock companies:

Perlman Rim Corp.....	New York
Hyatt Roller Bearing Co.....	Newark
New Departure Mfg. Co.....	Bristol
Dayton Engineering Lab. Co.....	Dayton
Remy Electric Co.....	Anderson
Harrison Radiator Corp.....	Lockport
Klaxon Co.....	Newark

The manufacturing departments of these various companies remain separate, but close co-operation is effected in the sales and service departments. Gross sales of the constituent companies for the nine months ended March 31, 1917, were \$23,500,000, as compared with \$17,200,000 for the corresponding time in the previous year. The authorized and outstanding stock of the company consists of 1,200,000 shares (no par value) of common.

The officers of the company are: President, Alfred P. Sloan; vice-president, E. A. Deeds; secretary and treasurer, DeWitt Page; chairman of the finance committee, L. G. Kaufman.

Government Survey of Housing Facilities

WASHINGTON, July 30—The organization of a Homes Registration Service, for the utilization of available housing facilities in war industry zones, is being completed by the Department of Labor. The work will be performed in co-operation with the Council of National Defense, state and local defense bodies, and the U. S. Employment Service.

A survey is under way of the available houses, flats and rooms in each community. Lists will be compiled from the survey results, which will be distributed to the various offices of the U. S. Employment Service so that workers seeking jobs may at the same time be able to learn of available lodgings. In compiling the lists, such factors as effect of locality on nationality, types of houses and rooms, and classes and sex of workers are considered.

Ford Production Decreased

DETROIT, July 30—Production of the Ford Motor Co. after Aug. 1 will be 350 passenger cars and 400 trucks a day which is in accord with government wishes. It is estimated that at the close

of business July 31, when the fiscal year ends, the year's production will be, in round figures, 677,000 cars. The estimate is based upon the fact that during the first 10 months and 24 days of the 1918 fiscal year the output of cars was 651,191. Since then production has been steadily decreasing. With an average daily production of 1000 during June and 750 during July the remainder of the fiscal year would total about 25,750 cars. This, added to the above figures would aggregate 676,940 cars. How many Ford cars could have been easily disposed of can be estimated also from the fact that on June 10 the company had on its books unfilled orders calling for 89,242 touring cars, 9824 runabouts, 3013 coupes, 1675 sedans, 5234 trucks and 1619 chassis. Subsequent reports state the company being 110,000 cars behind.

Service for Regal Cars at Old Plant

DETROIT, July 27—Maurice Rothschild having purchased the complete equipment of the defunct Regal Motor Car Co., including all the property, goodwill, patterns, etc., will operate the property here.

Canadian Makers to Ask for Steel

TORONTO, ONT., July 29—The directors of the Automobile Manufacturers' Assn. of Canada met in Toronto this afternoon to discuss what action should be taken to request the Government to secure for the industry a sufficient supply of steel. Fear was expressed that the decision reached by the United States Government to reduce the supply of steel to certain industries, including that of the automobile, might have a serious effect on automobile manufacture in this country.

Gordon M. McGregor, general manager of the Ford works at Ford City, who attended the meeting, remarked the shutting down of the plant had been due to the difficulty of obtaining material, especially steel, and also to the fact that the Ford company wished to take a careful inventory of its true position at the present time.

Unless some action is taken by the Government, it is feared other plants will also have to suspend operations. The Government will be approached shortly, with a request to give the matter most careful consideration and early attention.

A German Tank Captured by the French

Copyright Underwood & Underwood

Several German tanks like the one here shown with the French crew which repaired it and used it against the Germans, have been captured in the recent fighting near the Marne. They are 33 feet long, overall, weigh 40 tons and are driven by two 4-cylinder Daimler engines of 100 horsepower each. Their speed on top gear is about 8 m.p.h. In general design they are simply creeper-type tractors armored with 1½ in. plates in front and ¾ in. plates elsewhere. The armor is said to be comparatively soft. The gun equipment comprises a piece, the equivalent of the British 6-pounder, which has a bore of approximately 2½ in. and 8 heavy type machine guns. The crew of each tank is made up of 12 men

M. T. S. Divisions Defined

New Organization Will Consist of Two Units Similar to Airplane Service

WASHINGTON, July 30—Further reorganization of the motor transport divisions of the Army in this country contemplates two divisions, similar to the airplane service, with one division purchasing and controlling production, and the other directing operation and training.

The purchasing, procurement and production will continue under the Motor Transport Service headed by Col. F. Glover. The operations and training is planned to come under a new separate army division to be known as the Motor Transport Corps and to be headed by Major Barrett Andrews, who, it is reported, will shortly be promoted to a colonelcy. Major Andrews has seen service for the past year with the American Expeditionary Forces under General Rogers, who controls the Motor Transport Corps of the A. E. F.

Further plans include division of the organization under Major Andrews into two sections, one headed by Lieut. Colonel W. D. Uhler and in charge of operations and convoys, the other to take charge of training. The chief of the training section has not yet been named, but this section will have the special attention of Major Andrews, who plans to inaugurate a system of training in this country that will give the personnel of the Motor Transport Corps experiences similar to those they will encounter in France.

Heretofore the operations section of the Motor Transport Service was combined with the maintenance and recently was under the direction of George Randles, who will remain in charge of maintenance.

Further standardization has been completed with the adoption of the Indian, Harley-Davidson and Solo motorcycles as the standard motorcycles in the general motor transport equipment. The Westfield bicycle has been taken as the standard bicycle.

The motorcycles will be known under type letters as follows:

Indian "I."
Harley-Davidson "H."
Solo "S."

Adoption of these motorcycles apparently marks the downfall of the original Liberty motorcycle which had been designed specially by motorcycle engineers for the U. S. Army and which was to have been the standard.

Type letters have also been announced to denote the passenger cars used in the army, as follows:

Ford "F."
Dodge "D."
Cadillac "C."

The Motor Transport Service is now giving attention to trailers and will

shortly announce the standardization and type names.

Continued Scarcity of Common Labor

WASHINGTON, July 27—Reports for the week ended July 13 indicate a continued scarcity of common labor. Common labor conditions appear normal in Florida, Mississippi, Indiana, Michigan, Colorado and some sections of New England, but an acute shortage is reported throughout the balance of the nation, being especially serious in the Central and Southern States and in every Atlantic State from Connecticut to Georgia. Railroads and mines in the central states are losing their common labor because of the high wages offered in the harvest fields.

Shortage in the skilled trades division is also nation-wide and growing. There is hardly an industrial community where there are any unskilled workers, with the exception of automobile workers in factories. Machinists and boiler makers are in general demand. The greatest shortage for skilled workers lies along the Pacific and Atlantic coasts and in the states other than Indiana bordering on the Great Lakes. Out of 110 cities reporting skilled trade conditions, 26 show a shortage, 31 a surplus and 35 balanced conditions. The farm labor situation seems to be well in hand in the central wheat belt, but farm laborers are scarce in the East and in the Southern States.

A surplus of inexperienced women applying for clerical positions is noticeable. The demand for women in factory work is increasing and there is a great demand for their service in domestic and hotel work. Out of 133 cities reporting the female labor situation 42 show a shortage, 42 surplus and 49 normal conditions.

Labor Situation Still Acute

WASHINGTON, July 26—A slight improvement in the common labor situation is indicated by a report for the week ended July 6, although the shortage is still nation wide and critical. One hundred and five cities reported shortage against 109 for the week previous. Cities with common labor surplus increased from 10 to 16, those with a balanced condition remain the same. There is a demand among employers of skilled labor for boiler makers, machinists, iron workers, lathe hands and tool makers. Mechanics other than machinists are needed in Connecticut, Delaware, Georgia and parts of Texas. There is a demand in the East for farm labor.

Increased Demand for Women's Overalls

From every quarter comes evidence of the extent to which women are finding places in the industries of the country. According to reports from several manufacturers of them, women's overalls are selling in large quantities throughout the country. The largest markets are in the West and Middle West, but New England and the Eastern States are taking fairly large quantities. The chief call, say the makers, is for garments cut along lines which give ample freedom of movements.

To Recruit Unskilled War Labor

U. S. Employment Service Will Supply Workers to Many Manufacturers

WASHINGTON, July 29—On Aug. 1 the United States Employment Service will begin recruiting unskilled labor for employers engaged in war work who have filed orders for workers with the state directors of the service prior to July 30. The total demand, as shown by these orders, will be ascertained this week and divided among the states on a quota basis. State quotas will be announced Aug. 1. Orders received from employers after Aug. 1 will be compiled and quotas announced Aug. 15. Additional quotas will be made up on the same basis and announced from time to time as unskilled labor demands develop.

The prohibitions against private recruiting of unskilled labor by employers engaged in war work whose maximum force, including skilled and unskilled labor, exceeds 100, go into effect on Aug. 1.

In order that there may be no interruption in the labor supply of the more important war industries after Aug. 1 and before the program of the United States Employment Service for securing the men needed can be put into full operation, private field forces will be permitted to continue recruiting under regulations drawn up by the United States Employment Service which will provide, among other things, that labor thus secured shall be credited to the quota which is to be supplied by the community where such workers are obtained. No such recruiting may be done except with the permission of the State Director of the United States Employment Service where it is conducted. Full information concerning methods by which such private recruiting may be conducted can be secured from the Director General of the United States Employment Service at Washington.

25,000 Laborers Needed

WASHINGTON, July 27—The severe shortage of unskilled labor in war industries is indicated by the first 600 war plants to send in their requirements to the United States Employment Service asking for 25,000 common laborers now and 40,000 during August and September. The total of 25,000 men wanted now represents a direct shortage.

The Department of Labor expects to complete the State Advisory Boards of the United States Employment Service in the 28 states east of the Mississippi this week. These boards, which will administer the central labor recruiting program in each state, will act as court of appeal from decisions of the Community Labor Boards, and will be comprised of representatives of the states, employers, employees and the Government.

Spruce and Fir Output Nears Requirements

Almost Enough Lumber Cut to Supply Allied Governments with Needed Material for Airplane Construction—350 Pieces of Spruce Used for Each Plane—11,000,000,000 Feet Standing

WASHINGTON, July 27—Production of spruce and fir for airplane construction is coming close to the requirements of this country and the Allies. The total spruce and fir shipped to June 15, including that delivered to the Allies, was: spruce, 52,000,000 feet; fir, 20,800,000 feet.

The frames of airplane wings, ailerons, fins, rudders, elevators, and stabilizers, the struts, landing gear, fuselage, flooring, engine bed, after-deck and seats are made of wood and preferably of spruce. This is because spruce is the toughest of soft woods for its weight, and possesses great shock absorbing qualities. Furthermore, it does not splinter when hit by a missile. Sitka spruce, white spruce and red spruce are used.

Specifications for Parts

About 350 pieces of spruce are required in a single airplane, but not all of them are individually different; the wing beams are practically of similar dimensions, and the struts vary only in size according to the strains put upon them.

Roughly, the specifications for spruce parts are: Straight grain, clear from knots and defects so as to give maximum strength. The size of the rough pieces must be such as to insure a finished dimension after deducting losses for finishing, checking and shrinkage. Desirable pieces run from 1 1/4 in. to 3 in. thick, 3 in. and upward in width, and from 5 ft. to 17 ft. in length. Practically all the available spruce is in the United States and along the western coast of British Columbia. In our country it grows close to the Pacific Coast on the western slopes of the Cascade range in the states of Washington and Oregon. The stand of Sitka spruce, which is the best airplane stock, in these two states is estimated at 11,000,000,000 feet. But less than half of it is near enough to transportation facilities or in dense enough stands to be commercialized. The total spruce shipped for the first three months of 1918 was over 20,000,000 feet, but the U. S. Government and the Allies required more than three times that quantity in that time, showing that we were not up to requirements in March.

11,000,000,000 Feet Standing

The vast total of eleven billion feet standing, however, is not all available for airplane construction, and never will be, because only a small per cent of the spruce is suitable for such use. It is stated that about 30 per cent of a good spruce log is available for airplane stock. At the outbreak of the war, very little spruce was being cut or shipped, and it remained for this country to supply the necessary amount.

On September 7, 1917, under the National

Defense Act, orders were placed in the name of the Secretary of War with the western spruce mills, which required them to give preference to Government orders. Col. Brice P. Disque, Signal Corps, was detailed to investigate the situation. He proceeded to Portland and reported to the Aircraft Board that the hostile attitude of labor and the shortage of labor in the vicinity had been responsible for the lack of production. The report was approved by the Aircraft Board and later, on November 6, 1917, Colonel Disque was placed in command of the Spruce Production Division of the Signal Corps, which had been organized a short time previously.

Colonel Disque organized a volunteer logging army of experienced men as part of the Signal Corps to supplement civilian labor in the logging camps, detailing them to camps producing Government aircraft lumber. All lumber-camp and mill conditions were supervised; food, housing and transportation of employees were regulated. A basic eight-hour day, with time and a half for overtime, was established at all camps, and a standard wage scale for each occupation was adopted for civilians and soldiers. There are now about 15,000 troops engaged in this work.

Colonel Disque was supplied with a fund of \$20,000,000 with which to aid responsible operators, who were in need of money, to the extent of 30 per cent of their contracts. In the end he quadrupled the output of spruce.

The felling of the trees and the transportation of the logs were not the only problems of production; the timber had to be cut up into airplane stock. The Government adopted a method employed in the woods, known as riving or splitting the logs longitudinally into cants. This made transportation easier and permitted the selection in the forest of the suitable stock which split straight and clear. Forty-nine saw-mills were available, but they did not operate well on Government contracts and had not the facilities required. Early in 1918 thirty-six of them closed, claiming a car shortage.

By erecting the largest saw mill in the world in 45 days, the Spruce Division made a distinct record. Work of erection was begun on December 24, 1917, and the mill was completed February 7, 1918. This huge cut-up mill is at Vancouver Barracks, Wash. It has twelve separate log carriages for conveying the spruce to twelve head saws, back of which are complete sets of edgers, cut-off saws and other machinery necessary to convert the rived or sawed cants into finished stock. This mill cost the Government in the neighborhood of \$200,000. There are 1,940 men in the second Provisional Regiment who operate this cut-up plant, working in three shifts of 8 hours each.

Before the war this sort of lumber was seasoned by air-drying, but the great demand for spruce necessitated a kiln-drying process. This was worked out by the Forest Products Laboratory, of the Forestry Service, and a plant costing \$350,000 was erected at Vancouver Barracks. A saving in shipping weight of 33 1/2 per cent was effected by shipping dried wood to factories. Beam stock now requires twelve days and smaller parts about seven days for drying, a saving of considerable time as compared with the air-drying system.

When operations began in the neighbor-

hood of Vancouver Barracks there was a great scarcity of wire rope and other materials. Steps were immediately taken to secure control of the wire rope situation, sizes were standardized and distribution of wire rope was taken over by the Spruce Division, with the result that to date 6,000,000 feet of wire rope have been provided for the use of the loggers. After standardizing logging engines, the Logging Equipment Section secured 175 of these engines. Other equipment secured included 10 tons of wedge steel, innumerable jacks, steam engines, electric motors, saw-mill equipment and over 200 miles of rails.

Previous to the first week in February aircraft lumber shipments were handled individually.

Since February aircraft shipments have been consolidated with cars containing other Government lumber and handled in special through trains to Eastern points. The time of transit has been reduced by nearly 50 days. An average time of 15 days from the mill to Eastern factories is now being made.

It was first decided to use open freight cars for transporting this lumber, but on account of the character of the material it has been found necessary to ship aircraft lumber in closed cars. By thus protecting the lumber from the weather an increase in the number of cars required has resulted.

There is very little waste at the saw mills manufacturing airplane material, as all the stock unsuitable for aircraft requirements is still utilized as general commercial lumber. The percentage of split spruce logs now available is more than twice that before the war, due to the riving process. In July, 1917, new grading rules were established whereby the quantity of spruce necessary to be purchased for each plane was reduced practically a third.

Fir and Port Oxford cedar are used in aircraft manufacture when spruce is not available. The possibility of using laminated sections in the wooden construction of airplanes will tend to increase the amount of spruce available for this use.

A thorough canvass has been made of the entire spruce situation in the United States, detailed reports having been obtained from each section of the country. In the Northeast and New England States the Navy Department, in co-operation with the Bureau of Aircraft Production, is securing a maximum output of airplane spruce. In the South and Southeast a similar canvass has been made and plans are now under way for the production of spruce in this section.

New England Spruce Lumber Prices Fixed

WASHINGTON, July 29—Prices for New England spruce lumber have been fixed by the Price Fixing Committee appointed by the President, after considering information submitted by the Federal Trade Commission on the cost of producing this lumber and information submitted by representatives thereof at hearings were considered. The prices have been set in agreement with the manufacturers and will be in effect from July 19 to November.

They will cover all purchases by the Allied governments, the railroads and other customers regularly purchasing lumber for mill shipment. The prices on all New England spruce lumber in the states of Maine, New Hampshire, Vermont and Massachusetts are not to exceed those given in the issued list. They

To Cut Tire Production*(Continued from page 205)*

of rubber consumed in pneumatic tires was about 65 per cent of the total; the present uses are now being ascertained through a questionnaire, the results of which will, we believe, show a decrease and that the increased consumption during the last three months has been due to essential uses.

A general working classification of the industry, in the order of approximate importance, is as follows (it always being assumed that Government orders take precedence):

- (a) Medical rubber goods.
- (b) Rubber footwear.
- (c) Waterproof clothing.
- (d) Solid tires and pneumatic tires for commercial use.
- (e) Mechanical rubber goods for the operation of industry.
- (f) Insulated wire.
- (g) Pneumatic tires for essential passenger use.
- (h) Bicycle tires.
- (i) Hard rubber goods other than medical.
- (j) Mechanical rubber goods for less essential use.
- (k) Rubber cement.
- (l) Pneumatic tires for pleasure use.

The Problem and Suggestions for Meeting It

The problem which is confronting the Government and the rubber industry to-day is the conservation of crude material and the control of the consumption of the finished product, the end to have in mind being an assured supply of the products necessary for the war activities and sufficient importation of crude rubber to meet these requirements and to insure that they will be met in spite of any temporary interruption of ocean traffic. In this connection it must be borne in mind that it takes, on an average, about four months for rubber to come from the plantations to the manufacturer here, so the plans in connection with importation must be made far in advance.

The War Service Committee fully realizes the necessity for conserving shipping space across the Pacific (even though all of the rubber so imported in 1917 would occupy only 2.7 per cent of the total tonnage required for all imports) and for conserving manufacturing facilities and labor here and reducing the consumption of rubber to such an extent as may be consistent with the continued filling of the real needs of the war and of the public and preserving the national prosperity.

To this end the War Service Committee makes the following recommendations:

1. Recommendations as to Decreasing Production of Certain Articles

This committee believes that there should not, at the present time, be any restriction imposed as to the production of articles connected with athletics, which should be continued in order to develop and contribute to the public health.

Nor does the committee now make any recommendations as to those articles in which the uses of rubber are of an incidental character, forming only a small part of the article as a whole.

The War Industries Board might wish to consider eliminating the production of the following articles, or, pending the compilation of more detailed statistics, reducing their production during the two months of August and September, 1918, to such an extent as the War Industries Board thinks wise. This could be done under an order of the War Trade Board, a draft of which is presented as Exhibit E in the Pamphlet of Exhibits accompanying this memorandum, and would conserve rubber to some extent

Letter of the War Industries Board Which Requests Cut in Tire Production

MY DEAR MR. WORK:

Your industry has operated during the months of May, June and July on the plan of allocation of crude rubber under a limited tonnage arrangement with the War Trade Board and, as additional information is necessary before finally determining upon the allocation for August, September and October (which information you are now compiling), it has been determined that for the months of August and September substantially the same arrangements and percentage of allocation will continue.

Your industry should understand that the need of conserving shipping space is as great, or perhaps greater than when this matter was first taken up last April. We understand that while approximately 25,000 tons were licensed for import during the months of May, June and July (although considerably more than this has been received), approximately 50,000 tons will have been consumed by the industry. It is obvious that something radical must be done at once to curtail the consumption of rubber and we feel sure we may rely upon the support of the industry in taking such immediate steps as may be necessary to conserve the present stocks of rubber now in the country and those due to arrive.

The Government departments are making every effort to determine requirements of crude rubber for essential war and business purposes, and as soon as this information is at hand steps will be taken to insure the import of sufficient rubber to meet those requirements.

As a means of conserving the stocks of crude rubber now in the country, your committee has suggested curtailment of the production of pneumatic automobile tires and tubes during the months of August and September, and we request you:

(a) To pledge the manufacturers of pneumatic tires and tubes to restrict the production in tonnage of rubber consumed and in numbers of casings and tubes to the extent of 50 per cent of the production for the corresponding months of August and September of last year. But in no event shall the manufacture of pneumatic casings and tubes during the month of August, 1918, or the month of September, 1918, exceed 50 per cent of the monthly average for the year 1917 both as to amount of rubber used and number of pieces produced. This restriction is exclusive of Government business.

(b) That you carefully consider restricting the manufacture of all other articles involving the use of rubber, as every possible saving should be made.

and conserve manufacturing facilities and labor to a greater extent:

Bathing Caps	Pitcher Mats
Mats and Matting	Poker Chips
(except for insulation purposes)	Umbrella Rings
Chair Tips	Toy Balloons
Tobacco Pouches	Flowers
Bath Mats	Bathing Garments
Bath Mitts	Advertising Specialties
Bath Pillows	Telephone Ear Pads
Beard Softeners	Cuspidors
Beauty Brushes	Goggles
Carriage Mats	Atomizers for Perfumery
Auto Mats	Bust Forms
Change Mats	Camera Bulbs
Cuspidor Mats	Chin Bands
Door Mats	Cigar Holders
Drainboard Mats	Cigarette Holders
Flower Pot Mats	Complexion Bulbs
Rubber Toilet Sponges	Household Gloves
Toys	Tires for Horse Drawn Vehicles
Rubber Bands	
Glass Mats	

You are thoroughly familiar with the industry to which we look to patriotically and conscientiously cut out the consumption of crude rubber at every point where it can be done without injury to the nation's welfare.

A curtailment such as mentioned above, in the production of pneumatic tires and tubes and other articles, will not accomplish the desired result unless some plan is evolved for limiting and regulating the use of motor vehicles, and we expect the use of rubber tires will be restricted except for actual war and essential business purposes. We are not at liberty at this time to announce our plans for accomplishing this purpose, but will do so in the near future.

Every necessary step should be taken to discourage and prevent hoarding of the finished product by manufacturers, wholesalers, dealers and consumers, and we ask you—

(a) To evolve some plan, and put it into effect, which will accomplish this end, and to see to it that if any one of these factors are guilty of hoarding, that steps be taken to prevent their securing additional supplies.

(b) That advances in prices be prevented. We look to you to see that this is accomplished.

Before arrangements are concluded for the importation of rubber after the month of September, with your co-operation we expect to evolve definite plans which will accomplish the purposes we are after, i.e., the conservation of every foot of shipping space possible by the conservation and restriction of the use of rubber.

We ask that you facilitate your final arrangements for co-operation with the Conservation Division in making such changes in the manufacture and distribution of your product as will result in the conservation of rubber during the period of the war.

We anticipate your complete co-operation in all of the above matters, and assure you of our desire to see that the industry is provided with the necessary raw materials to take care of the war and essential civilian needs as soon as they can be determined, and give you our further assurance that we desire to curtail the industry only in so far as it may become necessary to meet the war needs.

We understand that there will be a general meeting of the industry at an early date, at which time you will have an opportunity to lay all of these facts before the manufacturers.—Yours very truly, War Industries Board, by George N. Peek, Commissioner of Finished Products.

To Bertram G. Work, Chairman War Service Committee, care B. F. Goodrich Company, 1780 Broadway, New York City.

2. Recommendations as to Motor-Driven Vehicle Statistics

In order to obtain an accurate knowledge as to the classes of uses of motor-driven vehicles and the number employed in each class, the War Service Committee strongly urges that a Federal Licensing plan be at once put into effect along the lines set forth in detail in Exhibit F contained in the Pamphlet of Exhibits accompanying this memorandum. This is believed to be the only practical way of obtaining the information which should be had and of enforcing any regulations that may be adopted toward controlling the uses of motor-driven vehicles.

3. Recommendations as to Reducing Pneumatic Tire Production

As some time would necessarily elapse before the information could be compiled

through the Federal licensing plan; above suggested, this Committee recommends, to prevent the disastrous condition, which seems to be imminent, that immediate measures be taken to reduce the consumption of rubber in pneumatic tires suitable for pleasure vehicles, by requiring each manufacturer to reduce its production of pneumatic casings (and tubes therefore) of sizes up to 6 in. (6 in. and over being used entirely on trucks) and reduce its consumption of rubber in such casings and tubes to one-twelfth of its 1917 production and consumption—always excluding Government orders.

This may be done through an order to be issued by the War Trade Board, along the lines of Exhibit E, requiring each manufacturer to limit its consumption in August and September to one-twelfth of the total amount of crude rubber used by it during 1917 in the specified casings and tubes, and also requiring it to limit its production of those articles to one-twelfth of the total number of such articles produced by it during 1917.

It is obvious that the unnecessary use of motor-driven vehicles cannot equitably be controlled by a restriction in the importation of crude rubber; it can be limited by controlling the use made of the imported rubber, but that would not meet the situation existing because of the stocks in the hands of many users. It can completely and fairly be controlled only by regulation of the use of the vehicles themselves, based upon a licensing plan somewhat along the lines above proposed. The vehicles themselves should be controlled rather than any one element of them.

4. Recommendations as to Notice of Restrictions

This Committee desires to point out that the restriction of production of pneumatic casings and tubes for limited periods will induce unwarranted buying and hoarding before the restrictions become effective unless notice of restriction is accompanied by an announcement of the proposed possible restriction of use under Federal control of license. The Committee strongly recommends that such announcement be made at the time when notice of restriction is given.

5. Recommendation as to Importation

The increase in the demand for rubber articles, due to war activities and industries connected therewith, is such that the 100,000 tons which are now permitted to be imported are inadequate even on a very conservative estimate, as is shown in detail in Exhibit G forming a part of the Pamphlet of Exhibits presented with this memorandum. We recommend a tentative importation at the rate of 160,000 tons, as stated in Exhibit G.

These figures show the necessity of increasing the shipping of rubber to this country, to avoid serious consequences, even though the excess amount of rubber shipped here be held in this country for allocation at a later date. Any plans for such increase should be made now, as the time required for delivery from the source to the manufacturer is practically four months, and it would be far better to have an excess of rubber come in during the fall months, when advantage could be taken of shipping facilities and when transportation from the Coast to the manufacturer is much more prompt than in the winter months when everything possible should be done to lessen the congestion of traffic.

6. Recommendation as to Principle Which Should Be Adopted

This Committee believes that the only safe and logical course to follow is to restrict the uses of crude rubber to any point that may be found necessary, no matter how drastic

such restriction may ultimately be, and provide for the importation of sufficient crude rubber surely to meet this requirement, which involves the accumulation of stocks adequate to tide over any temporary failure of transportation facilities.

The existing plan appears to be to permit importation to an amount based upon estimates of what should be required, but as the uses of the rubber are not controlled, the stocks are being dissipated and the country is approaching the danger point, as no provision has as yet been made for replenishing stocks and for insuring the use along essential lines in the future.

This committee, knowing that the rubber industry desires to work wholeheartedly to carry out any regulations put into effect by the governmental departments, and that it will do so particularly if all of the circumstances are fully explained and known, requests that, in the interest of the most complete understanding and co-operation, this committee be given an opportunity to call together and to explain to the whole industry whatever regulations may be decided upon, and to do this before those regulations have otherwise been announced. A complete understanding will furnish a basis for directing the efforts of the rubber industry most effectively along the lines of the needs of the Government and of the public as a whole.

In making the above presentation of facts and recommendations, the War Service Committee of the rubber industry has endeavored to place the War Industries Board in a position to view the situation in its true light, in order that the Government may fairly meet the responsibility which necessarily rests upon it in dealing with this industry. The responsibility of this committee has been met when it has presented the facts and its recommendations.

The War Service Committee of the rubber industry is ready, at any time, to meet the War Industries Board and other governmental departments to answer any questions that may be asked and further to discuss any suggestions that may be made.—Respectfully submitted, B. G. Work, chairman; H. S. Firestone, J. N. Gunn, G. B. Hodgman, P. W. Litchfield, H. T. Dunn, C. T. Wilson.

Exhibit B

A greater part of the crude rubber imported is of the plantation character, coming from British and Dutch possessions in the Far East. Roughly speaking, 70 per cent from British territory and 30 per cent from Dutch. It is mainly shipped to Pacific ports.

The following table is submitted:

Total tonnage in the Pacific in units of cargo tons of 100 cu. ft. during 1917	2,333,140 tons
Total weight of crude rubber imported during 1917 at Pacific ports	113,846 long tons
Or in cargo tons of 100 cu. ft.	85,095 tons
Or 3.6 per cent of the total tonnage.	
Value of imports at the Pacific Coast during 1917	\$539,335,640
Value of crude rubber imports ..	150,151,590
Reduced to percentages 3.6 per cent of the total Pacific tonnage was used in bringing in 28 per cent of the value of the importations at the Pacific Coast.	

Ordinarily Plantation rubber will average about 30 lb. to the cubic foot in packing. Due to the successful experiments on the part of a large manufacturer we have demonstrated that rubber can be packed under pressure and baled with a space economy of somewhat over 25 per cent.

The manufacturer placed at the disposal of the industry the result of his experiments, and they were quickly acted upon. A large number of presses were sent out, others were built locally, and rubber is reaching America packed on the average of 35 to 40 lb. per cubic foot.

On the basis of the same importations and the same amount of tonnage, under the new method of packing 2.7 per cent of the total Pacific shipping space will be used.

Exhibit C

Summary of 448 replies out of 503 questionnaires—Sent out March 5, 1918.

Amount of crude rubber used in the production of specified classes of goods.

	Tons used during calendar year ending Dec. 31, 1917
Tires and Tubes—Class	
Automobile pneumatic casings....	71,664
Automobile pneumatic tubes....	14,422
Motor and bicycle tires and tire sundries	2,815
Solid tires	11,685
Casings and tubes combined....	8,782
Casings, tires and tubes combined	902
Mechanical rubber goods.....	21,323
Boots and shoes	12,688
Insulated wire and insulating compounds	2,756
Druggists' and stationers' sundries and surgical rubber goods.....	3,732
Waterproof clothing, including carriage cloth and rubber sheeting	1,590
Waterproof cloth, including single and double texture	585
Hard rubber goods.....	1,165
Rubber cement	1,462
Miscellaneous, not included in any of the above schedules.....	1,798

Exhibit E

Draft of suggested notice to be sent to manufacturers by the War Trade Board, curtailing the production of certain articles.

In accordance with the second paragraph of clause 5 of the guaranty given us, under which deliveries of crude rubber are made to you, specifying that all sales of manufactured or partly manufactured goods be subject to the control and regulation of the War Trade Board and to comply with any rules or regulations concerning such sales providing methods, restrictions and limitations under which such sales may be made, you are advised as follows:

Under date of Aug. 1, and effective for two months thereafter, the manufacturer of pneumatic casings and tubes therefore shall not consume for the two months more than one-twelfth of his total amount consumed in each class of said articles during 1917, neither shall the number of pieces exceed one-twelfth of his output during 1917.

(Add here such restrictions on production of the articles listed in Recommendation No. 1 of our memorandum, as may be decided upon by the War Industries Board.)

Exhibit F

Federal Licenses for Motor Vehicles

It is suggested that the Government shall immediately require all motor (including motorcycles) vehicles to display thereon in conjunction with the regular state or city license plate a Federal license tag or plate.

The plan as outlined hereinafter contemplates the use, exclusively, of the existing state or city license boards and no staff of clerks would be required to be employed by any Federal department or by the War Industries Board.

It may possibly require in Washington the detailing to some one person with four clerks and stenographers, to conduct the correspondence with the highway commissioners or secretaries of state or other heads of licensing boards during the short period incidental to making clear to them the contemplated plan, but it is believed that the whole matter will involve but little work on the part of the Government other than that indicated.

The plan could be made immediately effective by first calling in conference the heads of the licensing boards of Massachusetts, New York, Connecticut, New Jersey, District of Columbia, Maryland and Illinois, placing on them the responsibility of formulating plans for immediate procedure. No delay should ensue, as there is at present close co-operation between all of the existing licensing boards, and it would not add to the expense of administration of these boards to any extent that would not be compensated by the charge of the proposed fees of \$2 per vehicle, which sum, if it is considered too large, could safely be reduced to \$1.

If the Federal Government does not care to take the formal initiative in this, a conference should be called in Washington of the heads of the licensing boards above referred to; they will then make plans to take the suggestion of the War Industries Board and make the plan effective on their own initiative.

The Federal license tag shall bear a letter indicating the character of the use of the vehicle.

For further identification, each tag shall be of a different color selected for each of the several classes.

It is recommended that the existing license board of each of the states (or in some few cases—cities) shall be utilized for the issuing and registration of the Federal licenses.

Each license board shall charge the owner of the vehicle, in payment for registration and tags, the sum of \$2 (or \$1) for each set of license tags for each vehicle.

Written applications for Federal licenses shall be filed with each license board.

The license board shall issue to the owner of the vehicle a Federal license and receipt for registration fee with the tags or plates.

It may be required that the applicant for the license shall state under oath the use made of each of the vehicles licensed.

Federal license tags shall be issued as follows for each of the classes of vehicles described after the corresponding letters:

- A (Green) Trucks or motor vehicles with solid rubber tires (except electric passenger cars).
- B (Blue) Trucks or motor vehicles (commercial bodies) using pneumatic tires or pneumatic and solid tires, for the conveyance of materials or merchandise.
- C (White) Motor vehicles (passenger) running for hire, including taxis, jitneys and busses.
- D (Red) Motor vehicles (passenger bodies) used by physicians and surgeons in professional work, hospitals, institutions, mercantile and manufacturing owners or companies or persons using vehicles in the conduct of their business.
- E (Brown) Motor vehicles (passenger or commercial bodies) used by farmers or owners in rural communities using their cars for passenger or merchandise transportation in connection with their work and living.
- F (Yellow) Privately owned passenger vehicles used for recreation, convenience or pleasure, whether driven by the owner or by paid chauffeur or driver.
- G (Black) All motor vehicles (passenger and commercial) in the service of Federal, State or Municipal Departments or Employees, or owned or used by Government Controlled Railroads or Government Controlled Express Companies.

The issuing of such licenses under the request or direction of the War Industries Board by the utilization of existing licensing

facilities of the various States or Cities—

- (a) Will afford accurate means of determining the number of vehicles in each class in any and all states and cities or communities;
- (b) Will provide a means for the regulation of the use of all vehicles;
- (c) Will provide means for the exclusion or limitation of the use of all vehicles in any class;
- (d) Will provide means, if and when it may be deemed necessary for the control of the consumption or distribution of fuel and oil;
- (e) And in case of Class F, will afford means for the restriction of the use of such vehicles unless driven by the owner (unless under special license).

The foregoing plan is submitted in the belief that it is essential to secure accurate information regarding the use of all cars before attempting to promulgate any rules for regulation or limitation, or even for specific direct Federal taxation or control of supply of fuel.

The plan insures securing this vital information promptly, as it is believed that all cars may be registered and provided with license plates within thirty days after such plates and the necessary application and receipt forms are supplied to each of the local license bodies.

It is further suggested that the license plates and tags first used shall, with the distinguishing letter and color, bear the year date, 1918, and that provision be made for stamping on a small space provided on the tag the corresponding State or City license number to provide against fraudulent use of Federal identification tags or plates.

Exhibit G

The consumption during the quarter ending June 30, 1918, was 52,000 tons. During that quarter there was no restriction in force regarding the use or consumption, so it may be stated that normal requirements for 1918 would be at least 200,000 tons as compared with about 160,000 tons during 1917.

The Government is working on a basis of allowing importation of 100,000 tons, or 220,000,000 lb.

Consumption 1917 for the U. S. was about 157,360 tons, or 352,000,000 lb.

We feel 220,000,000 lb. insufficient, even granting:

A. Restriction of automobiles within reasonable limits.

B. Elimination of all non-essentials.

C. Whatever may be accomplished through the matter of standardization and simplification of varieties and kinds of the whole industry.

For example:

Total rubber consumption	
U. S., 1917.....	352,000,000 lbs.
Total rubber consumption tire industry U. S., 1917.....	247,000,000 lbs.
Total rubber consumed in solid tires in U. S., 1917—less....	26,000,000 lbs.
Total rubber consumed in pneumatic tires U. S., 1917.....	221,000,000 lbs.
One-half of rubber consumed in pneumatic tires, 1917....	110,500,000 lbs.
To provide for solid tires and 6 in. and over pneumatic tires for trucks and Government purposes—present requirements for solid tires being three times the requirements of 1917, irrespective of increased demand for pneumatic truck tires of 6 in. and over—add.....	100,000,000 lbs.
Consumption of rubber for all other purposes 1917, all articles other than tires....	105,000,000 lbs.
Requirements as against.....	315,500,000 lbs.
Estimated by the Government	220,000,000 lbs.
Difference, or	95,500,000 lbs.
	43,409 tons

We consider this example, which would require 143,409 tons to be imported as against the 100,000 tons estimated by the Government, to be ultra-conservative, for the following reasons:

A. January 1, 1917, there were licensed, 3,400,000 automobiles.

January 1, 1918, there were licensed, 5,200,000 automobiles.

An increase of cars during 1917 of 1,800,000, or 53 per cent.

Granting no automobiles produced in 1918, the nominal requirements for tires and consequent consumption of crude rubber would be greater in 1918 than 1917, and when we assume in the foregoing example the reduction of pneumatic tires and tubes by 50 per cent (for the purpose of illustration), we feel we are going further than the Government will eventually feel it wise to go in the reduction of tires for use on automobiles for essential purposes.

B. The allowance of 100,000,000 lbs. for truck tires for the coming 12 months will probably be about right, based on the present demand for truck tires.

C. We believe that the 105,000,000 lbs. provided for the manufacture of all other rubber goods, which is the amount consumed in 1917, is far too small, since:

(a) The speeding up of many of the industries for war purposes is calling for increased tonnage of mechanical goods.

(b) The demand for hospital supplies and electrical insulation is greatly in excess of a year ago.

(c) Sixty per cent of the total capacity of the country for certain heavy grades of rubber footwear is being taken by the Government, these being the grades that use the largest percentage of rubber in the footwear division.

We fear the Government expects a reduction in poundage consumption of crude, due to the work being done by the Conservation Division of the Government, with which the industry is working in close co-operation. For the next 6 months or year, while much will be accomplished in co-operation with the Conservation Division, which may mean more economy in labor, space, etc., we do not believe it will result in a reduction of poundage consumption of crude rubber.

For example:

1. If styles and kinds of hospital supplies were cut in two, it would not result in saving half the poundage of rubber, but only in doubling the amount of rubber consumed in the remaining styles and kinds. This would also be true as regards mechanical goods, footwear, etc.

2. Many styles and kinds will be eliminated altogether, and these in number may more than equal those retained, but those eliminated for the sake of economy and efficiency of operation would be styles and kinds of limited production in normal times, and consequently small tonnage of rubber consumed, which in our opinion would be for some time to come offset by the increased demand for the styles and kinds retained.

The total amount of tonnage involved in the proposed restrictions for August and September is small, with the exception of the curtailment of tire production. Figures are now being prepared to show the amount of rubber used in each class of articles during the last quarter, and these will be submitted to the War Industries Board as soon as they are available.

From the facts and figures already at hand, it is obvious that 100,000 tons is inadequate and that a minimum of 160,000 tons will be required under the most rigid restrictions of consumption.

We would, therefore, recommend that 160,000 tons per annum be taken as the tentative minimum, and that allocation for August and September be made upon this basis. Before a further allocation is necessary, the Board will have actual figures upon which to form a definite conclusion.

40,000 See Tractor Demonstration

(Continued from page 204)

the tractor field in the future than he has in the past.

There are some tractors much in need of the professional engineer, and though the engineer is not the be-all and end-all of the tractor design, it is imperative that his work be incorporated in it.

He is of the opinion that tractors in too many cases are rated too high. Too often the ratings represent the maximum capacity of the machine, which means that they have not enough reserve power. This is a mistake. The farmer is deceived by these over ratings.

Professor Davidson made a plea for a standard method of tractor rating. He was certain that it is coming, and no obstruction should be placed in its path.

He gave a few valuable words of advice to tractor salesmen. The tractor cannot be sold on price alone. It cannot be sold on horsepower alone. The necessity in every tractor is sound engineering that will give reliability and performance. Incidentally he told of how California is one of the greatest tractor states. It has very rough land, as well as a wide variety of soils, some light and others very heavy. The State has been a pioneer in the tractor field, and the farmers in California are not looking for the cheapest tractor but for the one that will give best results in the long run.

J. B. Bartholomew told of how the Salina demonstrations are the best that have ever been held. No better place in the country could be selected, as the tractors are plowing very hard soil in weather that is too hot for horses to work to advantage.

This year Kansas will produce 100,000,000 bushels of winter wheat, or one-ninth of all the winter wheat in the country.

E. J. Gittins of the Case company, and a member of the tractor committee handling the demonstrations, spoke very favorably of standardization and declared that gradually different tractors are coming closer and closer together to the eventual goal. While many may declare that many improvements have not been made during the past year, Mr. Gittins believes that very great progress has been made, not in a few but in a very large percentage of the machines.

Hardman Tire Reorganized

BELLEVILLE, N. J., July 31—The Hardman Tire & Rubber Corp. was reorganized on July 1, and the business will be continued under the style Hardman Rubber Corp. The present plant will be operated, and in addition a new plant will be built shortly. The present production is 125 tires a day, but the addition will increase this to 450.

The new officers are: President, Lorne A. Scott; vice-president and manager of production, Albert A. Pashek; treasurer, Walter Haefeli; secretary, Arthur C. Bang. Clayton C. Dobbs has been named sales manager and John D. Reynolds manager of sales for the southern territory, with headquarters in Baltimore.

The tire has been placed on the 5000-mile adjustable basis and will operate on the standard guarantee. Direct sales have been discontinued, and tires will be distributed by dealers.

N. A. D. A. Members Rolling In

ST. LOUIS, July 30—If the present rate of speed is maintained the National Automobile Dealers' Association will have its wanted 5000 members by September. There are about 3000 in now. At a big meeting in Boston last week Friday there ended a two weeks' campaign that brought the New England total to 445 and more are coming.

Last Wednesday in Newark, N. J., the New Jersey dealers endorsed the project, as did the Buffalo dealers the evening before. A big meeting is scheduled for Chicago to-night.

President F. W. A. Vesper and Executive Secretary E. E. Peake are traveling rapidly in their speech-making tours from city to city.

Paige Price Increased

DETROIT, July 31—The Paige-Detroit Motor Car Co. will increase the prices of its cars on Aug. 1, as follows:

Model	Old Price	New Price	Increase
6-29	\$1,395	\$1,515	\$120
Essex, 6-55	1,830	1,985	155
Larchmont, 6-55	1,950	2,090	140

Goodrich Purchases Resort for Employees

AKRON, July 30—The B. F. Goodrich Rubber Co. has purchased a large tract of land near the city, including Rex Lake, for a recreation center in addition to the athletic field maintained by the company. A large summer cottage has been erected on the grounds where employees may spend week-ends and their vacations. A bathing pier and beaches have been provided; also boats for fishing, basketball and tennis courts. Free transportation between Akron and the lake, a distance of 9 miles, is arranged for.

Develop New "Liberty Aero Oil"

WASHINGTON, July 31—Development of a new aircraft engine oil to be known as the "Liberty Aero Oil," to be used in the Liberty engine and all stationary cylinder aircraft engines, by the Army and Navy, was announced to-day by the Department of Military Aeronautics. The new oil is a mineral oil, the result of experiments lasting 12 months, carried on by a staff of men who worked uninterruptedly on the problem. One officer worked so intensively that he became ill and died. This was Captain O. J. May. Captain May personally supervised the running of 37 engine tests in 25 days in a laboratory where 5 engine tests a week would ordinarily be a complete program. To determine lubrication and fuel at high levels Captain May

went to the altitude testing laboratories, an airtight building capable of having the air within it partly reduced and kept constant by means of exhaust air pumps.

It is stated that the new oil will be available in quantities sufficient to meet our airplane needs and that it will cost about 75 cents per gal.

Plans have also been completed and placed in operation for the reclamation of used oil, and at least 50 per cent can be used again under the scheme devised.

It is estimated that our airplane program will call for at least 5,000,000 gal. of lubricating oil and that since castor oil costs \$3 per gal. Captain May's experiments will save the Government at least \$11,000,000.

Michigan Plants Listed for War Work

DETROIT, July 30—Samples of the questionnaires to be sent out to all Michigan manufacturers by the Survey and Conversion Section of the War Industries Board in an effort to determine the possibility of converting their plants to war work have been made. At the meeting of the heads of the thirteen districts of Michigan plans were formulated for each district head to get in touch with every manufacturer in his district. Sub-chairmen for each industry within the district will be appointed by the district heads.

The war resources committee will act as a go-between in supplying Washington with plants that can do war work and that the government will get in touch with such plants as they are needed. The district representatives were told at the meeting to discourage building of all kinds of industrial work but to use buildings that were already standing or converted for war work.

Only One More Show for Canada

TORONTO, ONT., July 29—Other than the National Automobile Show of Canada, held in conjunction with the Canadian National Exhibition in Toronto, there will be no more automobile shows in Canada until after the war. This decision was reached at the board meeting of the recently organized Automotive Industries of Canada, and announced by its president, G. M. McGregor, of the Ford Motor Co. of Canada. The organization includes in its membership all Canadian car manufacturers (Briscoe, Chalmers, Chevrolet, Ford, Gray-Dort, Maxwell, McLaughlin, Studebaker and Willys-Overland), as well as many tire, parts and accessory manufacturers.

Plan Kansas City Tractor Show

KANSAS, MO., July 29—The fourth annual Kansas City Tractor Show will be held Feb. 10 to 15, 1919, in a special building to be erected on the plaza facing the Union Depot. The building will be approximately double the size of the one used last February. The tractor manufacturers have already practically signed up for space double the area used at the last show. The show, as formerly, will be conducted by the Kansas City Tractor Club, with Guy H. Hall as secretary and manager.

are for delivery at Boston but do not include war tax on freight bills. The usual trade practice, including 1 per cent cash discount in 15 days or 30 days net, is to continue. The War Industries Board will have priority on all available supplies and will allocate supplies to Government departments and other essential uses as far as required. Any balance not so allocated will be released for sale to commercial buyers, but at prices no greater than determined upon. Foreign trade, except to Allied Governments, is not affected by the ruling.

The prices set for rough lumber range from \$48 to \$60 for specified lengths of less than 20 ft. and from \$36.50 to \$59 for random lengths. For planing one side there is to be added 50 cents per 1000 ft., for planing two sides, \$1; for planing one or two sides and matching or grooving, \$1.50; for planing four sides, \$1.50.

Chalmers and Maxwell Dealers Retain Lines

DETROIT, July 25—Contrary to reports the Maxwell Motor Sales Corp. is not making a general practice of combining Maxwell and Chalmers agencies. In a few instances the company has found it advisable to combine the field forces of the two lines and it has become a general impression that the company has been doing this all over the country. This has been denied by the company. A statement has been made that the dealers are not being disturbed and that each agency is handling its respective line as heretofore.

No Gasoline Profiteering in Bay State

BOSTON, July 27—There will be no profiteering in gasoline in Massachusetts as a result of the increase of $\frac{1}{2}$ cent a gallon permitted by the United States government. Fuel Administrator James J. Storrow, who has direct charge of all such matters throughout the State, received word that some of the retailers had boosted the price a few cents following the raise by the oil companies. Thereupon he issued a statement requesting that all persons who come across retailers who have advanced the price more than $\frac{1}{2}$ a cent to notify him at once, and he will stop the practice.

Under the powers granted him by the State and National government, Fuel Administrator Storrow may revoke the license of any such dealer to do business in Massachusetts, either for a few weeks or the period of the war. Examples have been made of other profiteers in sugar, flour, etc., and gasoline profiteers will meet the same fate.

To Continue Price-Fixing for Scrap Steel

WASHINGTON, July 27—The Price Fixing Committee of the War Industries Board announces that rumors circulated by certain publishing companies that fixing of prices for scrap steel would be discontinued are untrue. It states that control of scrap steel and stimulation of the scrap steel industry are matters of first importance in the emergency.

Castor Bean Industry Being Revived

108,000 Acres in Southern States and California—Growers Expect a Supply of 2,000,000 Gallons of Oil the First Year—Oil Essential for Rotary Motors

WASHINGTON, July 27—The planting of 108,000 acres with castor oil beans in 8 Southern States and California, Cuba, Haiti and Santo Domingo is proving successful, according to a statement from the Bureau of Aircraft Production. The supply of oil from this territory will be available this fall, some of it as early as August. It is estimated that the average acre will produce 20 gallons of oil of No. 1 grade, making 2,000,000 gallons for the first year.

The necessity of obtaining millions of gallons of castor oil for lubricating rotary aviation engines during the first two years of the war, when the available supply was only 700,000 gallons, was one of the several anticipated problems encountered in 1917 in the operation of the American air problems. In its solution—namely, the growing of castor oil beans in the above mentioned states and countries—the industry has been revived. Although castor beans are not native to this country it is believed that they will grow readily in the South. They can be grown between rows of citrus trees and also on land previously ruined for cotton growing by the boll weevil. The Government will let contracts for crushing the picked crops.

Briefly, the process of manufacturing castor oil entails the cold pressing of the beans for the extraction of the oil suitable for aviation engines and medicinal purposes. This oil is purified by a filtration process and is then ready for use. The residue of the first pressing is treated and an additional supply of inferior oil is obtainable. This is known as No. 3 grade. After the extraction of the inferior oil, castor pomace remains, which, when ground, makes a valuable fertilizer.

Before the war, the demand for castor oil for airplane engines, American medicinal and industrial needs called for about 2,500,000 gallons per year. Commercially it was used in the manufacture of soaps, inks, dyes, artificial leather and fly paper.

Co-operation Helpful

The results of this work, now well under way, are due in great extent to the co-operation between the Department of Agriculture, the War Trade Board, and the Materials Department of the Bureau of Aircraft Production, with foreign advice and assistance.

India has long been the world's leading source of supply for castor beans. Of the total imports into this country before the war, 80 per cent came from India. The American industry, which originally flourished in Oklahoma, Kansas, Missouri and Illinois, succumbed some years ago to the cheaper importations from India and could contribute but little to the demands of the air service.

In September, 1917, the castor oil situ-

ation assumed such a serious aspect that the Signal Corps, through the Secretary of War, secured the appointment of a board to deal with the difficulty. This body comprised representatives of the Aviation Section of the Signal Corps, Department of Agriculture, Export Bureau of War Trade Board and civilian experts. Deliberations of the Castor Oil Production Board resulted in the planting of castor beans in more than 100,000 acres in and near this country under Government contracts. The price recommended to be paid for beans so grown was \$3.50 per 46 lb. bushel.

Seeds Brought from India

Arrangements made with Great Britain for the seed supply resulted in releasing the steamship *Adelaid*, then being held at Bombay, although already consigned to this country. On January 7, 1918, this ship arrived with about 6000 long tons of castor beans. Approximately 200 tons were used as seed and the remainder pressed for oil by the original contractors, for immediate Government needs. This supplied about 500,000 gallons. More than a million gallons of oil were obtained from England for shipment direct to France. These supplies, together with oil from other sources, made a total of 2,400,000 gallons available.

Although castor oil is not essential as a lubricant for the Liberty engine, or most of the other reciprocating engines, it is essential to the efficient operation of rotary motors. In this type the gas is taken in through the crankcase where it comes in contact with the oil, but, as castor oil is only slightly soluble in gasoline, it is practically unaffected. Other important properties of this lubricant are its heavy viscosity and high lubricating value.

Although little has been said regarding the rotary motors in the air program, great numbers are now in use abroad and many more are in course of manufacture. The Air Service is using engines of this type in advanced training planes. One hundred and fifty of them have been finished and are now in use. Some 500 planes, now being manufactured, will take rotary motors, as will a new single seater, pursuit type plane for advanced training. The need of castor oil as a lubricant, therefore, has become a feature of the air program and the lack of it a serious handicap.

Oakland Employees to Have Holiday

PONTIAC, MICH., July 27—Thursday, Aug. 22, will be a holiday for employees of the Oakland Motor Car Co. On that date the company will entertain its workers with a picnic at Lake Orion.

AUTOMOTIVE MATERIALS MARKETS

Material Market Prices

Acids:	
Muriatic, lb. ....	.02-.03
Phosphoric, ct. ....	.35-.39
Sulphuric (60), lb. .	.11
Aluminum:	
Ingot, lb. ....	.13
Sheets (18 gage or more), lb. ....	.40
Antimony, lb. ....	.13½
Burlap:	
8 oz., yd. ....	.19
10 oz., yd. ....	.24½

Copper:	
Elec., lb. ....	.26
Lake, lb. ....	.26
Fabric, Tire (17¼ oz.):	
Sea Is., combed, lb. 1.65-1.70	
Egypt, combed, lb. 1.25-1.35	
Egypt, carded, lb. 1.20-1.30	
Peelers, combed, lb. 1.05-1.20	
Peelers, carded, lb. .95-1.05	
Fibre (¼ in. sheet base), lb.	
	.50

Graphite:

Ceylon, lb. ....	.07½-.25
Madagascar, lb. .	.10 -.15
Mexican, lb. ....	.03¾

Lead, lb.

.08½

Leather:

Hides, lb.18-.33½
-----------------	----------

Nickel, lb.

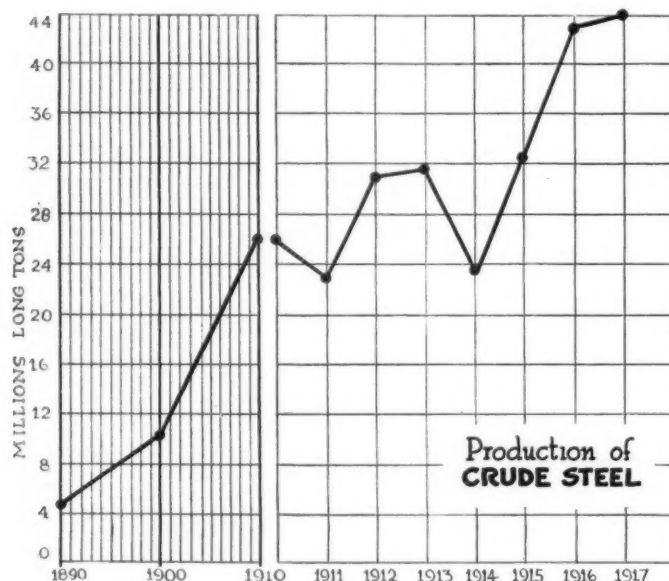
.40-.43

Oil:

Gasoline:	
Auto., gal. ....	.24
68 to 70 gal. ....	.30
Lard:	
Prime City, gal. 2.25	
Ex. No. 1, gal. 1.50-1.55	
Linseed, gal.	1.84
Menhaden, gal.	1.15
Petroleum (crude), Kansas, bbl.	2.25
Pennsylvania, bbl.	4.00

Rubber:

Ceylon:	
First latex pale crepe, lb. ....	.63
Brown, crepe, thin, clear, lb. ....	.60
Smoked, ribbed sheets, lb. ....	.62
Para:	
Up River, fine, lb. .	.68
Up River, coarse, lb. ....	.40
Island, fine, lb. .	.69
Island, coarse, lb. .	.27
Shellac (orange), gal. ....	.70-.76
Spelter ....	.08¾
Steel:	
Angle beams and channels, lb. ....	.03
Automobile sheet (see sp. table), Cold rolled, lb. ....	.06½
Hot rolled, lb. ....	.03½
Tin ....	.94
Tungsten, lb.	2.40
Waste (cotton), lb. .	.12¾-.17



Showing how the production of crude steel in the United States has increased in the past 27 years and the small percentage of increase in 1917 over the year before

AUTOMOBILE SHEET PRICES

(Based on No. 22 Gage. Other gages at usual differentials)

	Primes only Per 100 lb.	Primes seconds up to 15 per cent are taken Per 100 lb.
Automobile body stock	\$5.95	\$5.85
Automobile body stock, deep stamping	6.20	6.10
Automobile body stock, extra deep stamping	6.45	6.35
Hood, flat fender, door and apron, or splash guard stock	6.05	5.95
Crown fender, cowl and radiator casing, deep stamping	6.30	6.20
Crown fender, cowl and radiator casing, extra deep stamping	6.55	6.45
Automobile Sheet Extras for Extreme Widths:		
Nos. 17 and 18 over 36 in. to 44 in., 10c. per 100 lb.		
Nos. 19 to 21 over 36 in. to 44 in., 30c. per 100 lb.		
Nos. 22 to 24 over 26 in. to 40 in., 40c. per 100 lb.		
Nos. 22 to 24 over 40 in. to 44 in., 80c. per 100 lb.		
Black Sheet Extras to Apply to Narrow Widths:		
Oiling, 10c. per 100 lb.		
Patent leveling, 25c. per 100 lb.		
Resquaring, 5 per cent of gage price after quality, finish and size extras have been added.		
Seconds 10 per cent less than the invoice Pittsburgh price for corresponding primes.		

Automotive Securities Quotations on the New York and Detroit Exchanges

	Bid	Asked	Net Ch'ge		Bid	Asked	Net Ch'ge
*Ajax Rubber Co.	61	63	-2	*Saxon Motor Car Corp.	67½	7½	-½
*J. I. Case T. M. Co., pfd.	80	86	..	Standard Motor Construction Co.	12	14	..
Chalmers Motor Co., com.	4½	6½	+ ½	Standard Parts	60	65	+3
Chalmers Motor Co., pfd.	20	30	..	*Stewart-Warner Speed. Corp.	59¾	60¾	-1¼
*Chandler Motor Co.	85	85¾	+ ¼	*Studebaker Corp., com.	45½	45¼	-1½
Chevrolet Motor Co.	130	133	-2	*Studebaker Corp., pfd.	83	85	-5
*Fisher Body Corp., com.	38	39	+1	Swinehart Tire & Rubber Co.	50	55	-3
*Fisher Body Corp., pfd.	89	90½	-1½	United Motors Corp.	32	32½	-½
Fisk Rubber Co., com.	55	58	..	*U. S. Rubber Co., com.	61¼	61½	-¾
Fisk Rubber Co., 1st pfd.	98	103	..	*U. S. Rubber Co., pfd.	104¼	105	..
Fisk Rubber Co., 2nd pfd.	78	83	..	*White Motor Co.	42½	43¼	+ ½
Firestone Tire & Rubber Co., com.	108	111	..	*Willys-Overland Co., com.	19½	20	-½
Firestone Tire & Rubber Co., pfd.	92	95	..	*Willys-Overland Co., pfd.	81	84	+1¼
*General Motors Co., com.	154	154½	-1½				
*General Motors Co., pfd.	80	82	..				
*B. F. Goodrich Co., com.	46	46½	-1				
*B. F. Goodrich Co., pfd.	98	100	..				
Goodyear Tire & Rubber Co., com.	166	170	+3				
Goodyear Tire & Rubber Co., pfd.	97	97½	..				
Grant Motor Car Corp.	2½	3¼	-¼				
Hupp Motor Car Corp., com.	3½	4	-¾				
Hupp Motor Car Corp., pfd.	79	82	-3				
International Motor Co., com.	27	33	..				
International Motor Co., 1st pfd.	55	65	..				
International Motor Co., 2nd pfd.	35	40	-3				
*Kelly-Springfield Tire Co., com.	50	51	..				
*Kelly-Springfield Tire Co., 1st pfd.	79	87	..				
*Lee Rubber Tire Corp.	21	21½	+1½				
*Maxwell Motor Co., Inc., com.	28	28½	-1				
*Maxwell Motor Co., Inc., 1st pfd.	56	57	..				
*Maxwell Motor Co., Inc., 2nd pfd.	21	22	-1				
Miller Rubber Co., com.	110	112	-1				
Miller Rubber Co., pfd.	95	96	-1				
Packard Motor Car Co., com.	115	125	..				
Packard Motor Car Co., pfd.	94	97	..				
Paige-Detroit Motor Car Co.	18	20	..				
Peerless Truck & Motor Corp.	14½	16½	-½				
Portage Rubber Co., com.	119	122	-3				
Reo Motor Car Co.	13¾	14¾	-¼				

*At close July 27. Listed N. Y. Stock Exchange.

OFFICIAL QUOTATIONS OF THE DETROIT STOCK EXCHANGE
ACTIVE STOCKS

	Bid	Asked	Net Ch'ge
Auto Body Co. ....	..	7¾	..
Bower Roller Bearing Co.	16½	18½	..
Chevrolet Motor Co.	132	134	-1
Continental Motor Car Co., com.	5¾	5¾	..
Edmunds & Jones, com.	14	17	..
Edmunds & Jones, pfd.	75	90	..
Ford Motor Co. of Canada. ....	..	..	..
Hall Lamp Co. ....	..	14	..
Michigan Stamping Co., com.	12¾	..	..
Packard Motor Car Co., com. ....	..	125	+1
Packard Motor Car Co., pfd.	93	..	-1
Paige-Detroit Motor Car Co.	18¾	..	+ ¼
Prudden Wheel Co. ....	..	12	..
Reo Motor Car Co.	14¾	15	+ ¼

INACTIVE STOCKS

Atlas Drop Forge. ....	..	26	..
Kelsey Wheel Co.	25	..	..

Industrial Review of the Week

A Summary of Major Developments in Other Fields

Steel Makers to Increase the Allotment for Shipyards

A conference in New York Monday between Government leaders in ship-building, the Director of Steel Supply and the steel manufacturers' committee had to do with means of increasing the allotment of steel to shipyards, in view of the enlarging program for the Schwab drive. At a meeting in Washington later in the week plans will be made to insure shipyard work against interruption in the coming year, also for the prevention of lost motion through competing efforts of Washington departments, the commanding general in France and the Allies.

The whole tenor of the conference talk was that however detailed figures might be changed, the main fact was the increasing war demand for steel and with it an indefinite but inevitable reduction in the amount available for other uses.

The large schedules of steel for direct and indirect war needs give weight to the claim still widely made that all Governmental agencies concerned have put their requirements at top figures, in spite of repeated requests for pruning. In short, if deliveries meet schedule figures, it is believed the reservoir would be an ever filling one, unless the talked-of-railroad breakdown should be really serious. The half-year's demand for shell steel has risen to 3,000,000 tons, requiring a shipment rate probably 15 per cent above that now obtaining, and the plate total is close to theoretical capacity and about 12 per cent more than the recent record outputs.

Washington has come to the help of the jobbers, many of whom were left with small stocks owing to poor deliveries in recent months. For August the Director of Steel Supply permits them to receive from the mills shipments equal to their average in the first six months of the year. Beginning with September, however, the War Industries Board's plan becomes effective, permitting the replacement each month of the amount shipped by the jobber from stock for Government and essential purposes in the preceding month.—*Iron Age*.

Fifty Tractors in National Demonstration at Salina

(Continued from page 178)

said were impossible. They declared that it was impossible to do good plowing at speeds of 3.5 and perhaps 4 m.p.h., but to-day they saw some of the best plowing being done at those speeds. The redesigning of the plows has made this possible. To-day we saw a 10-foot Moline mower which makes it possible to cut 25 acres of hay in a single day and

also makes it possible to use a tractor efficiently with such a machine. The old 6-ft. machines were really too small for the tractor. To-day self-binders for cutting grains are being designed to withstand tractor speeds. They are better made and heavier. They must travel faster.

The tractor and the shortage of farm help demand it. So it is all along the line of farm machinery, and so already we see the entering of the wedge of an era of redesigning in farm machinery, changing it from the horse pace that it has followed for generations and placing it on the tractor pace standard.

Scripps Price Advanced

DETROIT, July 31—The Scripps-Booth Corp. will advance the prices of its cars on Aug. 1 as follows:

Model	Old Price	New Price	Increase
6-cylinder, touring...	\$1,195	\$1,385	\$190
4-cylinder, touring...	985	1,065	180

The price of the 8-cylinder model remains the same. New 6-cylinder coupe and sedan models, to be known as Model 42 and Model 41, respectively, will be sold for \$1,985. The company will bring out shortly a new Model K semi-coupe with a winter top. The sample has already been finished and production will begin immediately. No price has been announced yet.

The company manufactured 750 cars during July.

Used Car Sales Brisk in Detroit

DETROIT, July 29—Brisk sales of used cars are reported from Detroit territory. Only a few dealers say that business is not as good as it should be. Practically all dealers estimate their July business to be from 25 to 33 1/3 per cent better than June, and nearly all show marked increases over last year's business.

The Simonds Sales Co. reports that it sold during the first 27 days of July 95 used cars and 99 new ones, forty-nine being "trade-ins."

The future of the used-car business is exemplified in the action of the Thomas J. Doyle Co., distributor of Dodge Brothers cars. The company is about to establish another company to have the same name, which will be a new organization formed to buy and sell used cars. No cars will be accepted on consignment; all cars will be bought outright for cash and sold on easy terms.

Three men have been sent out on the road to cover the entire country in search of used cars. A large store at 734 Woodward Avenue has been leased and all lines of cars will be handled. The new business will open about Sept. 1.

Production of Coal and Distribution Satisfactory

The week's coal production while not establishing any new records has been heavy, closely approximating the best week the country ever experienced. Car supply has also been good, in some few cases equaling or even exceeding requirements. The accumulation of stocks is gradual and most pronounced in the case of the domestic and small industrial consumer. Railroad stocks are increasing with slowness as are also those of big industrial consumers.

The householders on the other hand are accumulating their winter's supplies, and it is probable that by cold weather there will be but few that ordered their coal last spring that will not have a supply sufficient to carry well into the winter.

Recent fear of congestion at various points, particularly in New England, has arisen more from a shortage of labor wherewith to unload cars than from lack of motive power. A greater variety of cars than formerly are also being employed in the coal trade and the use of other than dump bottom cars is occasioning considerable inconvenience. No one thinks of entering complaint, however, as all dealers and consumers are glad to get the coal irrespective of the car it is shipped in.

The Lake trade is heavy and it is probable that there will be no greater shortage in the Northwest during the coming winter than there was during the past.

In the Middle West some coal has been sold at less than the Government price. This is perhaps significant of the position that coal occupies in the market. Since the Government prices went into effect it has been seldom indeed that coal has been sold in the open market for less than the Government figures.

The car supply, taking the country as a whole, appears to be somewhat better than in some past weeks. In some localities in the East the car supply has been fully equal to the demand, while in Illinois some mines have only been able to work about three days per week. Much complaint is heard concerning this car distribution.—*Coal Age*.

To Produce 300 Tractors Daily

DEARBORN, MICH., July 30—The new Fordson tractor plant to be built in Hamilton, Ohio, is expected to be in production within 90 days and will employ between 500 and 1000 men. The plant will manufacture and assemble tractors for Ohio, Indiana, Illinois and territory south of the Ohio River. About 300 tractors will be manufactured a day.

Warner Joins Federal Truck

DETROIT, July 29—Harry J. Warner, former vice-president of the Continental Motor Co., has associated himself with the organization of the Federal Truck Co. He will act as vice-president in charge of production.

H. O. Penland, who has been sales engineer for the U. S. Ball Bearing Mfg. Co., with headquarters in Cleveland since the first of the year, has been appointed manager of the Cleveland office.

H. A. Van Tine has become affiliated with the Hurlburt Motor Truck Co., New York, as factory manager.

Coulter Merrick has been made head of the automobile accessory department of the Merrick-Anderson Co., Ltd., Winnipeg, Man. He is the son of Joseph A. Merrick, secretary-treasurer of the organization.

H. A. Conlon has been elected vice-president of the Acason Motor Truck Co., Detroit, to succeed J. F. Bowman, resigned. He will have full charge of Acason sales. Both Mr. Conlon and Mr. Bowman have been associated with the Federal Motor Truck Co.

Howard C. Caldwell, assistant advertising manager of the Haynes Automobile Co., Kokomo, Ind., has resigned to enter the Great Lakes Training Station.

Guy W. Morgan, former president of the Abbott Motor Corp., Detroit, who was in charge of the spare parts, tires and accessories for the original Motor Transport Section of the United States Army, has been appointed to similar duties under Colonel Glover in the new Motor Transport Service.

J. Monroe has been appointed district manager for the Denby Motor Truck Co. in the Rocky Mountain section, and will make his headquarters at Denver.

E. C. Molitor, for 8 years a district manager for the Cadillac Motor Car Co., Detroit, formerly with the General Motors Export Co. in the West Indies and South America, is now general sales manager of the Isko Co., Chicago.

A. B. Walker, until recently associated with the Budd Wheel Corp., Detroit, has joined the Bureau of Aircraft Production and will report immediately at a station in the East.

Williams Foundry Elects Officers

CLEVELAND, July 29—At the annual meeting of the Williams Foundry & Machine Co., the following officers were elected: President and general manager, F. E. Holcomb, vice-president, S. F. Zili-ox; secretary and treasurer, William Leary. These officers represent the interests which purchased control of the organization last fall. A 3-story building, 275 x 40, has been added which is devoted exclusively to the manufacture of Akron-Williams tire repair equipment.

**Men
of the Industry***Changes in Personnel and
Position***Acme Adds to Personnel**

CADILLAC, MICH., July 29—The Acme Motor Truck Co. has made several additions to its sales organization. G. M. Rockwell, formerly associated with the Republic Motor Truck Co., has been appointed district manager and special representative of the Acme Motor Truck Co., Cadillac, Mich., in charge of Virginia, Maryland, Delaware and North Carolina territory. J. A. Bell has been appointed district manager of the Gulf states east of Texas. F. P. Walker, formerly associated with the Hupp Motor Car Corp., will have charge of Acme sales in Nebraska and the western half of Iowa.

Lacey Leaves Cunningham

ROCHESTER, N. Y., July 26—V. E. Lacey, for eight years chief engineer of the James Cunningham Sons Co. of Rochester, manufacturers of high grade motor cars, has resigned to devote his entire attention to the Rochester Boat Building Works, now operating on government contracts. G. E. Franquist, formerly of the Simplex Motor Co., will succeed Lacey.

Moore Is White's New York Manager

CLEVELAND, July 26—William H. Moore, formerly manager of the White Co.'s Pittsburgh branch, has been appointed manager of the New York branch, to succeed R. H. Johnston, recently assigned to special executive work, with headquarters in Washington.

To Use Amber Lenses in Massachusetts

BOSTON, July 30—The Massachusetts Highway Commission has announced that a new regulation has gone into effect which legalizes the use of amber or yellow-tinted headlamp lenses in the state.

Herbert A. Townsley has been elected secretary of the Akron Automobile Co., Akron, succeeding Grover Reese, resigned.

H. M. Prewett has been appointed district manager of the Detroit branch of the Willard Storage Battery Co., in charge of service station sales. S. S. Jenkins, formerly district manager at Detroit, has been made district manager in charge of manufacturers' sales, with headquarters at Detroit.

Joseph L. Hardig, for several years with the Curtis Advertising Co., has been appointed director of advertising of the Remy Electric Co., Detroit. He will direct the national, trade paper and newspaper advertising of the Remy, which is a member of the United Motors Corp.

Hamilton Heads Lane Truck

KALAMAZOO, MICH., July 22—At a directors' meeting of the Lane Motor Truck Co., L. M. Hamilton, formerly secretary, treasurer and general manager of the company, was elected president and general manager. Dr. W. W. Lang, former president, was forced to retire from that office due to other obligations. Edward W. Bitzer was added to the board of directors and elected secretary-treasurer.

John A. Drake, associated with the Campbell-Ewald Co., Detroit advertising agency, has joined the United States Army, and is stationed at Camp Custer. He has the rank of corporal.

R. B. Merrill has been appointed director of material purchases by the Swope-McCracken Co., Detroit, production machinist, which supplies materials to automotive companies. He was formerly connected with the Ford and Packard companies.

A. C. Westfall, former traffic manager for the Cadillac Motor Car Co., Detroit, has become associated with the Lincoln Motor Co., Detroit, in a similar capacity.

J. F. Bowman, vice-president and general manager of the Acason Motor Truck Co., Detroit, has resigned, and H. A. Conlon, sales manager, has been elected vice-president and director of sales. Mr. Bowman has been an official of the company for the past year, having resigned as sales manager of the Federal Motor Truck Co. after 5 years' service to take the position.

C. M. White, Jr., has joined the Firestone Steel Products Co., Akron, as sales manager. For the last 3 years he has been factory representative of the Detroit Steel Products Co., and previous to that, manager of the Stromberg Motor Devices Co.

**Edwards Heads Milwaukee Show
Committee**

MILWAUKEE, July 29—Frank J. Edwards, head of the Kissel-Kar Co. and the Edwards Motor Car Co., Dodge dealer, has been appointed chairman of the show committee of the Milwaukee Automobile Dealers, Inc., to take charge of the annual fall show to be held in conjunction with the Wisconsin State Fair at Milwaukee, Sept. 9 to 14.

At the latest meeting of the association the proposition of enlarging the scope of the body to include truck, accessory and supply and tire divisions was considered, and a special committee appointed to investigate the feasibility of the plan and ways and means of carrying it out. The M. A. D. is now distinctly a motor car dealers' organization, and the proposed changes would make it a broad trade association covering all lines of activity in the industry. A joint meeting of the various elements is planned to be held shortly.

Chevrolet-General Motors Stock Transfer Is Coming

NEW YORK, July 30—It is regarded as probable that the formal transfer of stock between the Chevrolet Motor Co. and the General Motors Corp., by which Chevrolet becomes a division of General Motors, will be effected within a very short time. Although the complete plan has been ratified by both companies, the actual transfer of stock has not been made yet. That this will be done soon, however, is indicated by the fact that the Capital Issues Committee has taken favorable action on the application of the General Motors Corp. to issue \$28,000,000 additional common stock with which to acquire the Chevrolet property.

Machine Shop Addition for Falls Motor

SHEBOYGAN FALLS, WIS., July 29—The Falls Motors Corp. will erect a machine shop addition immediately. This will be a 2-story building, 60 x 125, and is to be used for the completion of Government contracts for truck, airplane and tractor engines and parts.

Highway Trailer Erecting Addition

EDGERTON, WIS., July 29—The Highway Trailer Co., which is executing Government contracts for trailers for hauling airplanes, ordnance and quartermaster supplies, is erecting a new shop, 50 x 250 ft. James W. Manhall is general manager.

North-Light Motor Adds

TORONTO, ONT., July 29—The North-Light Motor Co., with offices in the Wesley Building, has taken over the 2-story factory at Hamburg, formerly occupied by the Silversmith Mfg. Co. A 4-cycle, high-speed gasoline engine, for boats, automobiles, trucks and tractors, as well as stationary engines, will be manufactured.

Additions for Motors Metal

DETROIT, July 29—The Motors Metal Mfg. Co. is erecting two large additions to its plant to take care of a Government order for metal parts to be used on ambulances. One building is 60 x 200, the other 60 x 50.

Addition for Wilson Body

DETROIT, July 29—The C. R. Wilson Body Co. is erecting a three-story addition to its factory at Clay Avenue and the Grand Trunk Railroad.

Litnum Bronze in Production

MILWAUKEE, July 29—The Litnum Bronze Co., organized some time ago by Milwaukee and Menomonie capital, is completing the work of converting the former plant of the Laursen Automatic Pump Co., Menomonie, into a foundry, rolling mill and manufacturing shop for

Current News of Factories

*Notes of New Plants—Old
Ones Enlarged*

the production of Litnum bronze material under the Ampco patents. The plant is already producing a limited quantity of welding rods for use in the oxy-acetylene process, and within a short time will be making billets. The plant will be equipped to manufacture bronze wire, tube stock and similar material.

Limousine Top Expands Plant

KALAMAZOO, MICH., July 22—The Limousine Top Co. has awarded a contract for the erection of a new building immediately adjacent to its present plant. Work has already begun on this structure.

Knight Tire Increases Output

CANTON, OHIO, July 29—The Knight Tire & Rubber Co. has increased its output from 200 to 760 tires per day.

Michigan Steel Castings Expands

DETROIT, July 27—The Michigan Steel Castings Co. is erecting an addition to its plant which, when completed, will add 53,700 sq. ft. At least 100 additional men will be employed. The building will be used for moulding, core making and the engineering department. The new unit will be completed in the fall.

Clark Equipment Opens Auditorium

BUCHANAN, MICH., July 23—The Clark Equipment Co. has provided an auditorium for its employees which may be used for athletics, theatricals and motion picture exhibitions. It has a seating capacity for 625 persons, and contains a complete stage with lighting and scenery.

Capital Increases

CANTON, OHIO, July 23—The Timken Roller Bearing Co. has increased its capital stock from \$200,000 to \$10,000,000.

AKRON, July 23—The Western Reserve Rubber Co., Akron, has increased its capital stock from \$10,000 to \$50,000.

General Aluminum Increases Capital

DETROIT, July 29—The General Aluminum & Brass Mfg. Co. has offered for sale a new issue of \$155,640 common stock and \$77,820 of 7 per cent preferred stock. The new stock is offered to present holders in the ratio of 30 per cent of the par value of the common stock holdings and 15 per cent of the preferred stock of July 10 record. Payments may be made in equal instalments, Aug. 10 and Sept. 10.

G. M. to Build Tractors in Monroe Motors Plant

PONTIAC, MICH., July 29—Two Samson tractors have been completed in that part of the Monroe Motors Co. plant which the General Motors Corp. leased some time ago. The schedule calls for 500 tractors in that plant. By the time these are finished it is expected that the tractor plant which the General Motors Corp. is erecting in Janesville, Wis., will be ready for operation. The report that the company intended to take over the entire Monroe plant is denied. At the Stockton, Cal., plant of the General Motors tractors for the Western trade and export business are being built. There are enough standing orders to keep that plant running for some time to come.

Evinrude Motor Making Grenades

MILWAUKEE, July 29—The Evinrude Motor Co., manufacturer of detachable rowboat engines, has converted 60 per cent of its capacity for war work. The company has received a contract for phosphor hand and rifle grenades. About 40 women are employed, and this number will be increased to 100 on Aug. 1.

Addition for Obenberger Forge

MILWAUKEE, July 30—The John Obenberger Forge Co. will erect a forge shop addition immediately for the manufacture of crankshaft, camshaft and similar forgings for the Government. The present plant was erected in 1916, and has been undergoing constant enlargement during the last 9 months.

Twin Fire Spark Expands

DETROIT, July 30—The Twin Fire Spark Plug Co. has moved to a larger factory at 720 Grand River Avenue. The company's dealer organization has also been enlarged considerably.

Bailey-Drake Offices Moved

CHICAGO, July 23—The Bailey-Drake Co., which represents manufacturers selling the jobbing and manufacturing trade, has moved its main offices to 1118 South Michigan Avenue. The company has branches in Minneapolis, Kansas City, Seattle and San Francisco.

General Aluminum Enlarges Factory

DETROIT, July 29—Construction on an extensive scale of factory buildings for the General Aluminum & Brass Mfg. Co. is now under way. The buildings are being added to the company's group, and are to be used in completing war work for the Government. The new units are as follows: Aluminum foundry, 2 stories, 100 x 100; brass furnace building, 40 x 100, to be equipped with sand bins in the basement and with simplex and coke furnaces.

Ordinance Contracts

WASHINGTON, July 29—The Ordnance Department of the United States Army has placed the following contracts and purchase orders:

Hale & Kilburn, Philadelphia; trays for supporting sewing machines, pedestal stands, vise plates.

Hydraulic Pressed Steel, Cleveland; steel billets.

Greenfield Tap & Die Corp., Greenfield, Mass.; adjustable tap wrenches.

Four Wheel Drive Auto Co., Clintonville, Wis.; tubular radiator.

Salisbury Wheel & Axle Co., Jamestown, N. Y.; Nash quad axles.

Sparks-Withington Co., Jackson, Mich.; dies for making shin guards.

Ford Motor Co., Philadelphia; overhauling trucks.

West Steel Castings Co., Cleveland; steel motor truck wheels.

B. F. Goodrich Rubber Co., Akron; rubber packing for howitzers.

The Nash Motors Co., Kenosha, Wis.; repair parts for Nash quad ammunition trucks.

Russel Motor Car Co., Toronto; machining shells.

Ford Motor Co., Detroit; set dies and tools.

Detroit Copper & Brass Rolling Mills, Detroit; cartridge case disks.

Eisemann Magneto Co., Brooklyn; magneto.

Nash Motors Co., Kenosha, Wis.; steering knuckle arms.

L. S. Starrett Co., Athol, Mass.; tools for 4-ton trailer.

H. Channon Co., Chicago; tools for artillery repair trucks.

Insley Mfg. Co., Indianapolis; light repair truck bodies.

The White Co., Cleveland; standard 1-ton truck chassis.

The Standard Tent & Awning Co., Toledo; tarpaulins for truck chassis.

The Nash Motors Co., Kenosha, Wis.; repair parts for Nash trucks.

Hale & Kilburn, Philadelphia; searchlight covers.

Edward G. Budd Mfg. Co., Philadelphia; release mechanisms for airplane flare.

Seek Bids for Canal Supplies

WASHINGTON, July 29—Sealed bids in triplicate are invited by the General Purchasing Officer of the Panama Canal, Washington, D. C., to be filed not later than 10:30 August 1, and furnished by steamer, free of all charges, on dock at either Cristobal (Atlantic Port) or Balboa (Pacific Port) Canal Zone, Isthmus of Panama. Full details regarding the

Contracts

form of contract, guaranty, etc., can be secured from the Washington office of the Panama Canal.

The articles specified follow:

500 feet cable, ignition, combination, high tension, single strand, 31-64 in. outside diameter of finished cable; to be suitable for severe tension service, "Packard" or equal.

12 Horns, Klaxonet, hand, type "S", for Indian motorcycles.

24 Horns, hand, Klaxon, type "L", for motor boats.

24 Pumps, tire, automobile, motorcycle and bicycle; to be equal to Cyclone pump shown on page 90 of Iver Johnson Sporting Goods Company's "Lovell Diamond" Bicycle Catalog; to fit standard automobile, motorcycle or bicycle valve stems.

12 Pumps, auto tire, 3-cylinder; to be equal to No. 9401, page 70, Catalog No. 9, Automobile Sundries Co., New York City.

200 Asbestos gaskets, 4 in. x 6 in. x 3/4 in. x 1/4 in. handhole.

60 Asbestos gaskets, 12 in. x 16 in. x 1 in. x 1/4 in. manhole.

Above gaskets to be in accordance with Panama Canal specification No. 329.

800 lbs. 1/4 in. packing, sheet, asbestos, millboard, plain, 40 in. x 40 in.

1800 lbs. 1/4 in. packing, sheet, asbestos, millboard, plain, 40 in. x 40 in.

Asbestos millboard must be made up of not less than 70 per cent pure long-fibered asbestos. It must be boxed for ocean shipment in boxes not containing over 75 lbs. It must stand a dry heat of 400 degrees F. without injury and not burn or disintegrate when dipped in acid.

500 lbs. packing, asbestos, sheet, brass wire insertion, 1/16 in.; to be in accordance with Panama Canal specification No. 327.

125 lbs. packing, fibre, sheet, red, 1/4 in. x 12 in. x 36 in.

25 yards drill, rubber, white back, 22 ounce, 50 in. wide, in one piece.

350 feet belting, rubber, 6-ply, 8 in.; to be in accordance with Panama Canal specification No. 331.

15 soft rubber valves, diameter 4 1/2 in., hole 3/4 in., thickness 3/4 in.

25 soft rubber valves, diameter 3 in., hole 1/2 in., thickness 3/4 in.

75 medium rubber valves, diameter 4 in., hole 3/4 in., thickness 3/4 in.

25 medium rubber valves, diameter 4 in., hole 3/4 in., thickness 3/4 in.

Above valves to be in accord with Panama Canal specification No. 326.

6 Pairs rubber boots, size 8. hlp.

12 pairs rubber boots, size 9, knee.

3000 feet hose, fire, canvas, rubber-lined, 2 1/2 in., in 50-foot lengths, complete without couplings.

Specifications for above can be secured from Panama Canal Office, Washington, D. C.

Dividend Declared

The Paige-Detroit Motor Car Co. has declared a monthly dividend of 2 per cent, payable Aug. 10 to stock of record July 31.

Engineer Contracts

WASHINGTON, July 27—The following contract was awarded to-day by the General Engineer Depot, War Department:

Dayton Rubber Mfg. Co., Dayton; Dayton airless tires and mounting tires.

WASHINGTON, July 27—The following contract was awarded by the Bureau of Supplies and Accounts, Navy Department:

Republic Motor Truck Co., Alma, Mich.; motor trucks.

Seek Bids for A Trucks

WASHINGTON, July 29—Bids for the manufacture of class A trucks will be opened at 11 a. m., Monday, Aug. 5, by the Motor Transport Service. Bids are requested for the manufacture of 5000 of these trucks.

Bids for Tractors Sought

WASHINGTON, July 24—The U. S. Indian Office requests bids on the following articles to be filed before 2 p. m., Aug. 2, 1918. A certified check of 5 per cent of the amount of the bid or a proper bond, must be submitted if the bid amounts to more than \$500. If the bid amounts to more than \$5,000 it will not be accepted.

1. One 12-to-16-ton capacity per hour ensilage cutter with automotive self-feed attachment and extension siding table connected to feed; provided with automatic safety device to protect feeder against knives; all gears and chains covered to protect operator from injury; to be all steel and mounted on trucks; all bearings to be self-aligning; cutter to be flywheel type with 3 knives and fan attached to flywheel to be about 42 in. diameter; size of cutter at throat to be 3/4 in. to 1 1/2 in.; to be equipped with 35 feet of 9 in. heavy blow pipe with deflector hopper joint and 30 feet of detachable joint distributor pipe.

2. One 10-to-20-h.p. farm creeper type tractor operating successfully on kerosene or distillate, so equipped as to give proper revolutions per minute for above ensilage cutter; tractor to be fitted with extra extension angle lugs and equipped with adjustable hitch so it can be fitted to any kind of farm implement.

3. One endless canvas belt 100 ft. long, 8 in. wide, 5 ply for above equipment.

4. Also quote for use with ensilage cutter and complete with belt a 20-hp., 3-phase electric motor, 440 volts.

Bids on high wheel tractors will also be received and receive consideration. Articles not differing radically from the above specifications will also be considered.

Calendar

RACING

Aug. 3—Uniontown. Uniontown Speedway Assn.

Aug. 10—Providence, R. I.

Aug. 17—Sheepshead Bay.

Sept. 2—Uniontown. Uniontown Speedway Assn.

Sept. 7—Chicago. Chicago Speedway.

Sept. 21—Sheepshead Bay.

Oct. 5—Cincinnati. Cincinnati Speedway.

ASSOCIATIONS

Aug. 5-9—Atlantic City, N. J. Motorcycle and Allied

Trades Assn., United Cycle Trade, Cycle Jobbers of America, Cycle Parts and Accessories Manufacturers' Assn. and Bicycle Manufacturers' Assn. Hotel St. Charles.

Oct. 7-12—Milwaukee. American Foundrymen's Assn. and 5 allied organizations. Milwaukee Auditorium.

SHOWS

July 29-Aug. 4—Salina, Kan. National Tractor Demonstration. Auspices of National Implement and Vehicle Assn.

Aug. 6—Fulton, N. Y. Tractor Demonstration. New York State Food Commission.

Sept. 2-7—Indianapolis, Indiana. State Fair. Indianapolis Automobile Trade Assn.

Sept. 9-14—Milwaukee. Milwaukee Automobile Dealers, Inc. Fourth Annual Wisconsin State Fair. Hart J. Ruddle, Mgr.

Sept. 14-21—Chicago. Automotive and Accessories War Exposition. Municipal Pier.

Oct. 14-27—Dallas, Tex. Seventh Annual Texas Automobile Show. Texas State Fair.

Oct. 16-18—Ottawa, Ont., International Plowing Match, Tractor and Farm Machinery Demonstration. Experimental Farm.

ENGINEERING

Sept. 2—Cripple Creek, Colo. American Institute of Mining Engineers.

Nov. 14-15—New York. Society of Naval Architects and Marine Engineers. Twenty-sixth general meeting. Engineering Societies Bldg., 29 West 39th Street.